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Boronlike Oxygen and Dielectronic Satellite Lines

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# Dielectronic recombination rate coefficients to excited states of boronlike oxygen and dielectronic satellite lines

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## Abstract

Energy levels, radiative transition probabilities, and autoionization rates for B-like oxygen ( $O^{3+}$ ) including  $1s^2 2s^2 nl$ ,  $1s^2 2s 2p nl$ , and  $1s^2 2p^2 nl$  ( $n=2-8$ ,  $l \leq n-1$ ) states were calculated by multi-configurational Hartree-Fock method (Cowan code) and relativistic many-body perturbation theory method (RMBPT code). Autoionizing levels above three thresholds ( $1s^2 2s^2 \ ^1S$ ,  $1s^2 2s 2p \ ^3P$ ,  $1s^2 2s 2p \ ^1P$ ) were considered. Configuration mixing ( $2s^2 nl + 2p^2 nl$ ) plays an important role for all atomic characteristics. Branching ratios relative to the first threshold and intensity factor were calculated for satellite lines and dielectronic recombination rate coefficients for the excited 105 odd-parity and 94 even-parity states. The dielectronic recombination rate coefficients were calculated including  $1s^2 2s^2 nl$ ,  $1s^2 2s 2p nl$ , and  $1s^2 2p^2 nl$  ( $n=2-8$ ,  $l \leq n-1$ ) states. The contribution from the excited states higher than  $n=8$  were estimated by extrapolation of all atomic characteristics to derive the total dielectronic recombination rate coefficient. The orbital angular momentum quantum number  $l$  distribution of the rate coefficients shows a peak at  $l=5$ . The total dielectronic recombination rate coefficient was derived as a function of electron temperature. The dielectronic satellite lines were also obtained. The state selective dielectronic recombination rate coefficients to excited states of B-like oxygen were obtained, which are useful for modeling O IV spectral lines in a recombining plasma.

**Key words:** boronlike oxygen, dielectronic recombination rate coefficients, energy levels, radiative transition probabilities, autoionization rates, excited states, dielectronic satellite lines

## I. INTRODUCTION

Dielectronic recombination (DR) is an important recombination process in high temperature plasma generally, and radiative recombination is important at low electron temperature.

In series papers of Nussbaumer and Storey [1-4] the total and effective DR rate coefficients were calculated for ions of C, N, O and Ne. Energies and radiative transition probabilities between these states were calculated in [1] by SUPERSTRUCTURE code. The accuracy of their data is estimated not so high to identify spectral features [2, 3]. For the autoionization rate, collision strengths obtained by the distorted wave approximation were used. Total DR rate coefficients were given in [2] for ions  $C^+$ ,  $C^{2+}$ ,  $C^{3+}$ ,  $N^{3+}$ ,  $N^{4+}$ ,  $O^{2+}$ ,  $O^{3+}$ ,  $O^{4+}$ , and  $O^{5+}$ . Their results were fitted in analytical formula in the range of  $T=10^3$  K -  $6 \times 10^4$  K. Effective DR rate coefficients were calculated in [2] for selected lines and to the ground and metastable states of ions  $C^+$ ,  $C^{2+}$ ,  $C^{3+}$ ,  $N^{3+}$ ,  $N^{4+}$ ,  $O^{2+}$ ,  $O^{3+}$ ,  $O^{4+}$ , and  $O^{5+}$ . Their data were also fitted in the range  $T=10^3$  K -  $6 \times 10^4$  K. The same method was used in [3] for calculation of effective DR rate coefficients for selected lines and ground and metastable states of ions  $Ne^{2+}$ ,  $Ne^{3+}$ ,  $Ne^{4+}$ ,  $Ne^{5+}$ , and  $Ne^{6+}$ .

In series papers of Badnell [5-8] and Badnell and Pindzola [9] it was studied the influence of core fine-structure interaction on dielectronic recombination at low temperatures for the same ions as by Nussbaumer and Storey [1-4] and also the dielectronic rate coefficient were computed for Be-like ions with  $Z=6-42$ . The code SUPERSTRUCTURE which was used in [1-4] was used only for the radiative transition probabilities. From this code the code AUTOSTRUCTURE was developed by Badnell [5-9] to calculate autoionization rates including configuration-mixing LS-coupling or intermediate - coupling. In the paper by Badnell [7], the detailed comparison were given for B-like C, N and O ions with data obtained by Nussbaumer and Storey [3]. The effective DR rate coefficients for lines agree within 10-20% with those of Nussbaumer and Storey [3] except some lines. The disagreement for these lines (factor 6) was explained in [7] by different values of autoionization rates used in [3] and [7].

Recently, DR rate coefficients to excited states of C II from C III ions were evaluated in Refs. [10, 11]. It was recalculated data for B-like C (CII from CIII) obtained by Nussbaumer and Storey [3] and Badnell [8]. It was used Cowan code [12] which gives more accurate data for energy than SUPERSTRUCTURE code used in [3] and [8] and, probably, the same data

for autoionization rates as AUTOSTRUCTURE code [8] (results for autoionization rates were not compared since their data were not given in [3] and [8]). Except consideration all configurations up to  $n=6$  in [11], contribution from configurations with  $6 < n < 500$  was taken into account. The importance of the contributions of highly excited state for DR rate coefficients was underlined by Hahn [13]. Since the DR rate coefficient to each excited state like  $\alpha_d(1s^22s^2nl(LS))$  are not given in Refs. [3, 8], new data for  $\alpha_d(1s^22s^2nl(LS))$  were presented in [11]. Similar method was used recently to evaluate DR rate coefficients for the excited states of C I ([14]) and Be-like carbon ([15]), neon ([16]), and oxygen ([17]).

In the present paper, energy levels, radiative transition probabilities, and autoionization rates for B-like oxygen ( $O^{3+}$ ) with taken into account 52 even- and 50 odd-parity configurations including  $1s^22s^2nl$ ,  $1s^22s2pnl$ , and  $1s^22p^2nl$  ( $n=2-8$ ,  $l \leq n-1$ ) states were calculated by multi-configurational Hartree-Fock method (Cowan code) and relativistic many-body perturbation theory method (RMBPT code). We presented detailed comparison our theoretical calculations with recommended National Institute of Standards and Technology (NIST) data to be sure in accuracy of our results. Autoionizing levels above three thresholds ( $1s^22s^2\ ^1S$ ,  $1s^22s2p\ ^3P$ ,  $1s^22s2p\ ^1P$ ) were considered. Branching ratios relative to the first threshold and intensity factor were calculated for satellites lines and DR rate coefficients for the excited 105 odd-parity and 94 even-parity states. The DR rate coefficients were calculated including  $1s^22s^2nl$ ,  $1s^22s2pnl$ , and  $1s^22p^2nl$  ( $n=2-8$ ,  $l \leq n-1$ ) states. The contribution from the excited states higher than  $n=8$  were estimated by extrapolation of all atomic characteristics to derive the total DR rate coefficient. The total DR rate coefficient was derived as a function of electron temperature. The dielectronic satellite lines were also obtained.

## II. ENERGY LEVELS, TRANSITION PROBABILITIES, AND AUTOIONIZATION RATE

We carried out detailed calculations of the radiative and autoionization rates for the intermediate states  $1s^22s^2(^1S)nl$ ,  $1s^22s2p(^1^3P)nl$ , and  $1s^22p^2(^3P, ^1D, ^1S)nl$  with  $n=2-8$ ,  $l \leq n-1$  (see Table I. Resulting list of levels consists from the 652 odd-parity and 710 odd-parity states. The atomic energy levels, radiative transition probabilities and autoionization rates were obtained by using the atomic structure code of Cowan [12]. It was found (see for example Pindzola et al [18]) that using this code, one could obtain good agreement

with experimental energies by scaling the electrostatic Slater parameters using the different factor (0.80 in [18] and 0.85 in our case) to correct for correlation effects. It should be noted that we used improved version of Cowan code freely distributed by Dr. A. Kramida via the Internet [19]. That version of computer code allowed to remove transitions with small values of transition rates  $A_r$  up to  $A_r < 10^5 \text{ s}^{-1}$ . Even with those limitation the resulting list of radiative transitions between the  $1s^2 2s^2 nl$ ,  $1s^2 2s 2p nl$ , and  $1s^2 2p^2 nl$  ( $n=2-8$ ,  $l \leq n-1$ ) states consists from the 12882 even-odd parity transitions and 15805 odd-even parity transitions.

The relativistic many-body perturbation theory method (RMBPT code) was also used for calculating energy and radiative transition probabilities. This method was described in detail in Refs. [20–22]. The results of our calculations are given in Tables II–V, and VIII.

In Table II, we give energies for the  $2s^2 2p \ ^2P_J$ ,  $2s 2p^2 \ ^2,4L_J$ ,  $2p^3 \ ^2,4L_J$ ,  $2s^2 3l \ ^2l_J$ ,  $2s 2p 3l \ ^2,4L_J$ , and  $2p^2 3l \ ^2,4L_J$  levels of  $O^{3+}$  ion. Theoretical results for energies obtained from the two codes, Cowan (columns 3 and 8) and RMBPT (columns 4 and 9) are compared with the data from the compilation of recommended NIST data (columns 5 and 10) [23]. We can see that the perturbation theory method (RMBPT code) agrees better for low-excited states with [23] than the scaled multi-configuration Hartree-Fock method (Cowan code). Detailed discussion about contribution of correlation correction for B-like ions were given in Refs. [10] and [20, 21].

The excited  $2s^2 4l \ ^2l_J$  -  $2s^2 7l \ ^2l_J$ ,  $2s 2p 4l \ ^2,4L_J$ ,  $2s 2p 5l \ ^2,4L_J$ , and  $2p^2 4l \ ^2,4L_J$  levels are considered in Table III. We compare energy data calculated by Cowan code (heading Cowan) and recommended data from Ref. [23]. We can see that disagreement is about 100 -1000  $\text{cm}^{-1}$  except few levels when disagreement becomes larger for energy data. It should be noted that there are no complete set of data in Ref.[23] even for  $2s^2 7l \ ^2l_J$  levels, only few for levels with  $2p^2 nl \ ^2,4L_J$  for  $n=4$ . We hope that our calculated energy can help to fill a lack of these data. The fifth and tenth columns in Table III give the weighted radiative transition probabilities summed for all lower levels under given level. Unfortunately we could not find any data for comparison. In [23] the values of radiative transition probabilities are given for some transitions but these data are not enough to obtain  $\sum(gA_r)$  for comparison with results given in Table III.

In Table IV, we present transition rates  $A_r$  ( $\text{s}^{-1}$ ) and oscillator strengths  $f$  of  $LS$ -allowed  $2s^2 2p \ ^2P_J$  -  $2s 2p^2 \ ^2L'_J$  and  $2s 2p^2 \ ^2,4L'_J$  -  $2p^3 \ ^2,4L'_J$  transitions in  $O^{3+}$ . Theoretical results for  $A_r$  and  $f$  are obtained from the two codes, Cowan (columns 4 and 7) and RMBPT

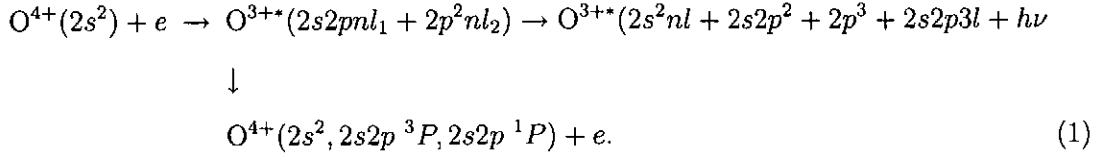
(columns 5 and 8) are compared with the data from the compilation in recommended NIST data (columns 6 and 9) [23]. Uncertainties in the recommended values given in [23] were estimated to be less than 10% based on comparisons with experimental results from lifetime and emission measurements. Our theoretical results are seen to agree between each other and with the recommended data at the 10–30% level. Since the present transition data are obtained using a single method, we hope that our calculated data for other transitions will also be reliable.

In Table V, we compare wavelengths and weighted radiative transition probabilities ( $gA_r$ ) obtained by Cowan's code with recommended NIST data [23] for  $2s^22p^2P_J - 2s2p4p^2L_{J'}$ ,  $2s^22p^2P_J - 2s^23d^2D_{J'}$ ,  $2s2p^2^2L_J - 2s2p4d^2L'_{J'}$ ,  $2s2p^2^4P_J - 2s2p5d^4P_{J'}$ , and  $2s2p3d^4F_{J'} - 2s2p4f^4G_{J'}$  transitions. We find good agreements for radiative transition probabilities with largest values of  $gA_r$ . It should be noted that NIST data for  $gA_r$  are given in pure *LS* approximation. The deviation from *LS* approximation for B-like ions was discussed in detailed in Ref. [22]. It is not reasonable to use pure *LS* approximation especially for transition with not very large values of  $gA_r$ .

Wavelengths ( $\lambda$  in Å), weighted radiative rates ( $gA_r$  in  $s^{-1}$ ), sum of weighted radiative rates ( $\sum gA_r$  in  $s^{-1}$ ) between the  $1s^22s^2nl$ ,  $1s^22s2pnl$ , and  $1s^22p^2nl$  ( $n=2-8$ ,  $l \leq n-1$ ) states are presented in Table VIII and Table IX. As we mentioned above, autoionizing levels are considered above three thresholds  $1s^22s^2^1S$ ,  $1s^22s2p^3P$ ,  $1s^22s2p^1P$ . In fifth column (heading  $A_a$ ) of Table VIII and Table IX are given autoionization rates,  $A_a$  relative to the first threshold,  $1s^22s^2^1S$ . Next column in Tables VIII and IX shows autoionization rates as sum of  $A_a$  calculated relative to the thresholds ( $E(1s^22s^2^1S) = 624382 \text{ cm}^{-1}$ ,  $E(1s^22s2p^3P) = 706615 \text{ cm}^{-1}$ ,  $E(1s^22s2p^1P) = 776180 \text{ cm}^{-1}$ ). The column with heading  $E_S$  in Tables VIII and IX gives excitation energies  $E_S$  relative to the first threshold  $1s^22s^2^1S$  in eV.

### III. DIELECTRONIC SATELLITE SPECTRA

The DR process to bound states of B-like oxygen happens as electron capture of Be-like oxygen to doubly excited states of B-like oxygen, followed by radiative decay to the bound states of B-like oxygen. That is,



As an initial state we consider the ground state of  $\text{O}^{4+}$ ,  $2s^2$ . The  $2s2pnl_1$  and  $2p^2nl_2$  levels are taken into account as doubly excited intermediate states.

During the DR process, DR satellite lines are emitted from doubly excited autoionization states to bound states. Radiative transitions from  $2s2pnl$  states to  $2s^2nl$  states give rise to satellite lines of the  $2snp - 2s^2$  line of the Be-like oxygen. There also exist DR satellite transitions from autoionizing states  $2s2pnl$  to  $2s2pn'l'$  without changing quantum principal number  $n$ . They appear at a longer wavelength region.

The effective emission rate coefficient of the dielectronic satellite line is

$$C_S^{eff}(j, i) = 3.3 \times 10^{-24} \left( \frac{I_H}{kT_e} \right)^{3/2} \frac{Q_d(j, i)}{g_0} \exp\left(-\frac{E_S(i)}{kT_e}\right) \text{ photons cm}^3\text{s}^{-1}, \tag{2}$$

$$Q_d(j, i) = \frac{g(i)A_a(i, i_0)A_r(j, i)}{\sum_{i'_0} A_a(i, i'_0) + \sum_k A_r(k, i)}, \tag{3}$$

where  $I_H$  is the ionization potential of hydrogen;  $j$  denotes a bound state;  $i$  a doubly excited state;  $i_0$  the initial state (which is  $2s^2$  ground state); and  $i'_0$  a possible final state for autoionization such as  $2s^2\ ^1S$  and  $2s2p\ ^3P, 2s2p\ ^1P$ . The statistical weight of the initial state  $i_0$  is  $g_0$ ;  $g(i)$  the statistical weight for a doubly excited state;  $A_a(i, i_0)$  the autoionization rate from  $i$  to  $i_0$  state;  $A_r(j, i)$  the radiative transition probability from  $i$  to  $j$  state; and  $E_S(i)$  is the excitation energy of the autoionizing state  $i$  relative to the first threshold,  $2s^2\ ^1S$ .  $T_e$  is an electron temperature and a Maxwellian distribution is assumed for electron velocities. This is an emission line intensity per electron per  $\text{O}^{4+}$  ion. For the most cases,  $A_a \gg A_r$  and then  $Q_d$  is roughly estimated as  $Q_d(j, i) \approx g(i)A_r(j, i)$ .

We already mentioned that autoionization rates ( $A_a(i, 2s^2)$ ), sum of autoionization rates ( $\sum A_a(i, i'_0) = A_a(i, 2s^2) + A_a(i, 2s2p\ ^3P) + A_a(i, 2s2p\ ^1P)$ ) and excitation energies ( $E_S$ ) for even- and odd-parity states are presented in columns 5, 6, and 7 of Tables VIII and IX. Weighted radiative rates ( $A_r(j, i)$ ), sum of weighted radiative rates ( $\sum_k A_r(k, i)$ ), and wavelengths ( $\lambda$ ) for odd-even and even-odd transitions are given in columns 8, 9, and 10 of Tables VIII and IX, respectively. Last two columns of Tables VIII and IX list relative

factor intensities  $Q_d(j, i)$  and effective emission rate coefficients ( $C_S^{eff}(j, i)$ ) define by Eq. (2). It should be noted that the number of transition listed in Tables VIII and IX is limited by including transitions with largest values of  $Q_d(j, i)$ . We include transitions with  $10^{11} > Q_d(j, i) > 10^8$  in units  $s^{-1}$ . That gives us the 571 instead of 12882 even-odd parity transitions (Table VIII) and the 652 instead of 15805 odd-even parity transitions (Table IX).

Fig. 1 shows examples of DR satellite line spectra for  $T_e=10$  eV. In this figure, we include data for the 571 even-odd parity transitions and the 652 odd-even parity transitions presented in Tables VIII and IX. Wavelengths (in Å, column 10), effective emission rate coefficients ( $C_S^{eff}(j, i)$  in units of  $10^{-15}$  cm<sup>3</sup>/s, column 12) and Gaussian profiles with spectral resolution,  $R = \lambda/\Delta\lambda = 500$  are assumed to synthesize these spectra. Synthetic spectrum of dielectronic satellite lines from  $O^{3+}$  ion at  $T_e = 10$  eV is divided for four spectra by increasing of wavelengths:  $\lambda = 140 - 360$  Å (Fig. 1a),  $\lambda = 600 - 900$  Å (Fig. 1b),  $\lambda = 950 - 1250$  Å (Fig. 1c), and  $\lambda = 2300 - 2700$  Å (Fig. 1d). The strongest lines shown in Fig. 1a were obtained by Rydberg transitions:  $2s2p^2 - 2s2pnd$  with  $n = 4 - 8$  together with  $2s2p^2 - 2p^23p$  and  $2p^3 - 2p^23d$  transitions. There are some strong lines ( $2p^3 - 2s2pnp$ ) created by strong mixing ( $2s^22p + 2p^3$ ) configurations. Numerous number of satellite lines are  $2s^2 - 2s2p$  transitions ( $2s^2nd - 2s2pnd$ ,  $2s^2np - 2s2pnp$ , and  $2s^2nf - 2s2pnf$ ) are responsible for the spectrum shown in Fig. 1b. There are contributions of  $2s2p3p - 2s2p5d$ ,  $2s2p3d - 2s2p5p$ , and  $2s2p3p - 2p^23d$  transitions to this part of spectrum  $O^{3+}$  ion at  $T_e = 10$  eV. Detailed discussion about distribution of satellite lines are given in Ref. [11] for B-like carbon.

#### IV. DIELECTRONIC RECOMBINATION RATE COEFFICIENTS FOR EXCITED STATES

The DR rate coefficients for excited states are obtained by summation of the effective emission rate coefficients Eq. (2) of DR processes through all possible intermediate doubly excited states:

$$\alpha_d(i_0, j) = 3.3 \times 10^{-24} \left( \frac{I_H}{kT_e} \right)^{3/2} \frac{1}{g_0} \sum_i Q_d(j, i) \exp \left( -\frac{E_s(i)}{kT_e} \right), \quad (4)$$

For the DR process described by Eq. (1), we need to calculate  $\alpha_d(i_0, j)$  with  $i_0 = 2s^2$  and all possible excited states  $j$  of  $O^{3+}$  with energies below the first threshold,  $2s^2 \ ^1S$  (624382 cm<sup>-1</sup>). Among  $1s^22s^2nl$ ,  $1s^22s2pnl$ , and  $1s^22p^2nl$  ( $n=2-8$ ,  $l \leq n - 1$ ) states, we found the



105 states of odd parity and the 94 states of even parity with energies less than  $624382 \text{ cm}^{-1}$ . Results of our calculations of  $\alpha_d(2s^2, j)$  for  $j$  with odd-parity states are shown in Figs. 6-9 and for  $j$  with even-parity states are shown in Figs. 10-13. Following to results for B-like carbon [11], we consider  $\alpha_d(2s^2, j)$  as function of electron temperature  $T_e$  from  $T_e=0.1 \text{ eV}$  up to  $T_e=0.1 \text{ eV}=120 \text{ eV}$ .

As can be seen from Figs. 6 - 13, the curves can be divided by three different groups. There are some curves without any maximum, as curves described  $\alpha_d(2s^2, j)$  for  $j = 2p^2(^3P)3p^4D_J$  (Fig. 7),  $j = 2s2p(^3P)3d^4F_J, 4D_J$  (Fig. 8),  $j = 2s2p(^3P)4d^4F_J, 4D_J$  (Fig. 9),  $j = 2s2p(^3P)3p^2S_{1/2}, ^2P_J, ^2D_J$  (Fig. 11),  $j = 2s2p(^3P)4p^2S_{1/2}, ^2P_J, ^2D_J, 2p^23s$  (Fig. 12). There are curves with two maximums (about 0.2 - 1 eV and 6 - 10 eV), as curves described  $\alpha_d(2s^2, j)$  for  $j = 2s^2np^2P_J, 2s^2nf^2F_J$  (Fig. 6) and  $2s^2nd^2D_J, 2s^2ng^2G_J$  (Fig. 10). The most of curves are with one maximum around 1 eV. Tabulated data of  $\alpha_d(2s^2, j)$  for 28 points of electron temperature  $120\text{eV} > T_e > 0\text{eV}$  are presented by Table X (105 states of odd parity) and Table XI (94 states of even parity).

In order to estimate contributions from autoionizing states with high  $n$  levels to the DR rate coefficients for excited states (sum over  $i$  in Eq. (4)), we use empirical scaling laws [11, 17]. Only one-electron  $2s - np$ ,  $2p - ns$ , and  $2p - nd$  dipole transitions are possible to include by using those extrapolation. Additional contributions from high- $n$  states we found for the first low-lying states,  $2s^22p$ ,  $2s2p^2$ , and  $2p^3$ . For these states we need to consider  $2s^22p - 2s2pns$ ,  $2s2p^2 - 2s2pns$ ,  $2s2p^2 - 2s2pnd$ ,  $2s2p^2 - 2p^2np$ ,  $2p^3 - 2p^2ns$ , and  $2p^3 - 2p^2ns$  transitions for  $n > 8$ .

To estimate  $Q_d(j, i)$  in Eq.(2) for autoionization states  $i$  with high principal quantum number  $n$  for  $2s2pnl$  and  $2p^2nl$  states and for  $2s - np$  and  $2p - nl$  dipole transitions we used our calculated data for  $n = 7$  and  $1/n^3$  scaling law for  $A_a$  and  $A_r$ .

$$A_a(2s2p(^{1,3}P)nl \quad ^{2,4}L_J) = \left(\frac{7}{n}\right)^3 A_a(2s2p(^{1,3}P)7l \quad ^{2,4}L_J) \quad (5)$$

$$\begin{aligned} & A_r(2s^2(^1S)2p^2P_J - 2s2p(^{1,3}P)nl \quad ^{2,4}L_J) \quad (6) \\ & = \left(\frac{7}{n}\right)^3 A_r(2s^2(^1S)2p^2P_J - 2s2p(^{1,3}P)7l \quad ^{2,4}L_J) \left(\frac{E(2s^2(^1S)2p^2P_J - 2s2p(^{1,3}P)nl \quad ^{2,4}L_J)}{E(2s^2(^1S)2p^2P_J - 2s2p(^{1,3}P)7l \quad ^{2,4}L_J)}\right)^3 \end{aligned}$$

An asymptotic formula was proposed in paper [24] in order to obtain energies for  $2s2p(^3P)nl$  and  $2s2p(^1P)nl$  states as a function of  $nl$  as follows. We obtain for energies

counted from the threshold:

$$E(2s2p(^{1,3}P)nl) - E(2s2p^{1,3}P) = -\frac{1}{2n^2} \left( Z - 4 + \frac{2.211}{n} \right)^2 \quad (7)$$

and for energy transitions between two states in Eq. (6)

$$\begin{aligned} & E \left( 2s^2(^1S)2p^2P_J - 2s2p(^{1,3}P)nl^{2,4}L_J \right) \\ &= E \left( 2s^2(^1S)2p^2P_J - 2s2p(^{1,3}P)7l^{2,4}L_J \right) - 8 \left( \frac{1}{n^2} - \frac{1}{7^2} \right) \times 219474 \text{ cm}^{-1}. \end{aligned} \quad (8)$$

Similar formula was used for excitation energies  $E_S(i)$  in Eq. (4) when  $i=2s2p(^{1,3}P)nl$

$$E_S(2s2p(^{1,3}P)nl^{2,4}L_J) = E_S(2s2p(^{1,3}P)7l^{2,4}L_J) - 8 \left( \frac{1}{n^2} - \frac{1}{7^2} \right) \times 27.21 \text{ eV}. \quad (9)$$

Using these scaling formulas for  $A_a(2s2p(^{1,3}P)nl^{2,4}L_J)$ ,  $A_r(2s^2(^1S)2p^2P_J - 2s2p(^{1,3}P)nl^{2,4}L_J)$ , we calculated  $Q_d(2s^2(^1S)2p^2P_J - 2s2p(^{1,3}P)nl^{2,4}L_J)$  as function of  $n$  and then using Eq. (9) for  $E_S$ , we calculate sums over  $n$  for  $\alpha_d(2s^2, 2s^22p^2P_J)$  as function of  $n$  and  $T_e$ .

Results of our calculations are illustrated by Fig. 2. We use for scaling our data calculated for  $n=7$  to reproduce our data for  $n = 8$  in order to check our scaling law. We found that difference between calculated and scaling data is about 10 % except some cases when mixing of configuration is very important. In Fig. 2, we demonstrate contribution of scaling data from  $n = 9$  up to  $n = 10$  (2), from  $n = 9$  up to  $n = 100$  (3), and from  $n = 9$  up to  $n = 30000$  (4). As can be seen from Fig. 2, there are no difference between results calculated up to  $n = 100$  and  $n = 30000$ . The second conclusion derived from Fig. 2 is an importance of high states for  $T_e > 1$  eV. For low electron temperature, low-lying states are important,  $2p^23s$  and  $2p^23d$ . Contribution of these states are shown in Fig. 2 by comparison curves describing  $\alpha_d(2s^2, 2s^22p^2P_J)$  for  $n = 4 - 8$  (1) and for  $n = 3 - 30000$  (5). Tabulated results contributions of high- $n$  states (from  $n = 9$  up to  $n=30000$ ) for  $\alpha_d(2s^2, 2s^22p^2P_J)$  are given by two columns of Table VI.

Similar data are presented in Table VI for DR rate coefficients,  $\alpha_d(2s^2, 2s2p^2^4P_J)$ ,  $\alpha_d(2s^2, 2s2p^2^2D_J)$ ,  $\alpha_d(2s^2, 2s2p^2^2S_{1/2})$ , and  $\alpha_d(2s^2, 2s2p^2^2P_J)$ . It was already mentioned that for  $2s2p^2$  states, we need to consider  $2s2p^2 - 2s2pns$ ,  $2s2p^2 - 2s2pnd$ , and  $2s2p^2 - 2p^2ns$  transitions. The most important for  $\alpha_d(2s^2, 2s2p^2^4P_J)$  is the first one,  $2s2p^2 - 2s2pns$  transition and the second one,  $2s2p^2 - 2s2pnd$  transition for  $\alpha_d(2s^2, 2s2p^2^2D_J)$  (contribution of  $2s2p^2 - 2s2pnd$  transitions is larger than contribution of  $2s2p^2 - 2s2pns$  transitions by factor

5). In both cases, contribution of  $2s2p^2 - 2p^2np$  transitions is smaller than two other by factor 10 - 50. Sum of these three contributions are given in Table VI for  $\alpha_d$  of the eight states  $2s2p^2$  configuration. We calculate also high- $n$  contribution for DR rate coefficients,  $\alpha_d(2s^2, 2p^3 \ ^4S_{3/2})$ ,  $\alpha_d(2s^2, 2p^3 \ ^2D_J)$ , and  $\alpha_d(2s^2, 2p^3 \ ^2P_J)$ . For  $2p^3$  states, the  $2p^3 - 2p^2ns$  and  $2p^3 - 2p^2nd$  transitions are important, but the high- $n$  contribution from these transitions is less than 1% from data given in Table X for  $2p^3$  states and they are do not be included in Table VI.

## V. TOTAL DIELECTRONIC RECOMBINATION RATE COEFFICIENTS

The total DR rate coefficients are obtained by summation of the rate coefficients of DR processes through all possible intermediate single and doubly excited states:

$$\alpha_d(i_0) = 3.3 \times 10^{-24} \left( \frac{I_H}{kT_e} \right)^{3/2} \frac{1}{g_0} \sum_i \sum_j Q_d(j, i) \exp \left( -\frac{E_s(i)}{kT_e} \right), \quad (10)$$

We already discuss contribution from doubly excited states with high  $n$  levels to the DR rate coefficients for excited states (sum over  $i$  in Eq. (4)). For total DR rate coefficients we need to consider also the contribution from single excited states with high  $n$ ,  $2s^2nl$  states. For these states,  $2s^2nl - 2s2pnl$  transitions are most important (see, Refs. [11, 14-17]).

To estimate  $Q_d(j, i)$  in Eq. (3) for  $j = 2s^2nl$  and  $i = 2s2pnl$  for  $n > 8$ , we used our calculated data for  $n = 7$  and  $1/n^3$  scaling law for  $A_a$  (Eq. (5)) and  $E_S$  (Eq. (9)). The values of  $A_r$  for  $2s^2nl - 2s2pnl$  transitions are almost constant as function of  $n$  since this is one-electron  $2s - 2p$  transition. We need to take into account the change of energy difference following Eq. (7).

$$\begin{aligned} & A_r \left( 2s^2(^1S)nl \ ^2l_J - 2s2p(^{1,3}P)nl \ ^{2,4}L_J \right) \\ &= A_r \left( 2s^2(^1S)7l \ ^2l_J - 2s2p(^{1,3}P)7l \ ^{2,4}L_J \right) \left( \frac{E(2s^2(^1S)nl \ ^2P_J - 2s2p(^{1,3}P)nl \ ^{2,4}L_J)}{E(2s^2(^1S)7l \ ^2l_J - 2s2p(^{1,3}P)7l \ ^{2,4}L_J)} \right)^3 \end{aligned} \quad (11)$$

Using asymptotic formula given by Eq. (8) that gives us in first approximation:

$$E \left( 2s^2(^1S)nl \ ^2l_J - 2s2p(^{1,3}P)nl \ ^{2,4}L_J \right) = E \left( 2s^2(^1S)7l \ ^2l_J - 2s2p(^{1,3}P)7l \ ^{2,4}L_J \right) \quad (12)$$

and finally we obtain [11]

$$A \left( 2s^2(^1S)nl \ ^2l_J - 2s2p(^{1,3}P)nl \ ^{2,4}L_J \right) = A \left( 2s^2(^1S)7l \ ^2l_J - 2s2p(^{1,3}P)7l \ ^{2,4}L_J \right). \quad (13)$$

To estimate  $Q_d(j, i)$  in Eq.(3) for autoionization states  $i$  with high principal quantum number  $n$  for  $2s^2nl - 2s2pnl$  (with  $l = 0 - 6$ ) dipole transitions we used our calculated data for  $n = 7$  and  $1/n^3$  scaling law for  $A_a$ . We also consider  $2s^2nk - 2s2pnk$  transitions with  $l=7$ . For this case, we start scaling from  $n=8$ .

Using these scaling formulas for  $A_a(2s2p(^{1,3}P)nl \ ^{2,4}L_J)$ ,  $A_r(2s^2(^1S)nl \ ^2l_J - 2s2p(^{1,3}P)nl \ ^{2,4}L_J)$ , we calculated  $Q_d(2s^2(^1S)nl \ ^2l_J - 2s2p(^{1,3}P)nl \ ^{2,4}L_J)$  and then using Eq. (9) for  $E_S$ , we calculate  $C_S^{\text{eff}}(2s^2(^1S)nl \ ^2l_J - 2s2p(^{1,3}P)nl \ ^{2,4}L_J)$ . Sums over  $LSJ$  and intermediate momentums  $^{1,3}P$  for  $C_S^{\text{eff}}(2s^2(^1S)nl \ ^2l_J - 2s2p(^{1,3}P)nl \ ^{2,4}L_J)$  give us data for expression of  $C_S^{\text{eff}}(2s^2nl - 2s2pnl)$  as function of  $nl$  and  $T_e$ .

Results of our calculations for  $C_S^{\text{eff}}(2s^2nl - 2s2pnl)$  are illustrated by Fig. 3 for  $2s^2ns - 2s2pns$ ,  $2s^2np - 2s2pnp$ ,  $2s^2ng - 2s2png$ , and  $2s^2nh - 2s2pnh$  transitions. Additionally, we calculate also  $C_S^{\text{eff}}(2s^2nl - 2s2pnl)$  for  $2s^2nd - 2s2pnd$ ,  $2s^2nf - 2s2pnf$ ,  $2s^2ni - 2s2pni$ , and  $2s^2nk - 2s2pnk$  transitions. We use for scaling our data calculated for  $n=7$  and to check our scaling law to reproduce our data for  $n = 8$ . We found that difference between calculated and scaling data is about 10 % except some cases when mixing of configuration is very important. In Fig. 3, we demonstrate contribution of scaling data from  $n = 9$  up to  $n = 10$  (curve "2"), from  $n = 9$  up to  $n = 100$  (curve "3"), from  $n = 9$  up to  $n = 1000$  (curve "4"), and from  $n = 9$  up to  $n = 30000$  (curve "5"). As can be seen from Fig. 3, there are no difference between results calculated up to  $n = 1000$  and  $n = 30000$ . It should be noted that the convergency of  $2s^2nl - 2s2pnl$  transitions is more slowly than for  $2s^22p - 2s2pnp$  transitions considered in previous section. We also present in Fig. 3 result of summing calculated data of  $C_S^{\text{eff}}(2s^2nl - 2s2pnl)$  from  $nl = 5s, 4p, 5g, 6h$  up to  $nl = 8s, 8p, 8g, 8h$ , respectively. As can be seen from Fig. 3, the curve "1" describing those data is above curves "2" - "5" describing scaling data only for low electron temperature  $T_e$ . For  $T_e > 1\text{eV}$ , the curve "1" is between the curves "2" ( $n = 9-10$ ) and the curve "3" describing contribution from scaling data from  $n = 9$  up to  $n = 100$ . We already mentioned previously that the importance of the contributions of highly excited state for DR rate coefficients was underlined by Hahn [13] and confirmed by results in Refs. [11, 14-17].

Final result of our  $2s^2nl - 2s2pnl$  scaling is shown by Fig. 4. In this figure, we present

$\sum_{n=9}^{n=30000} C_S^{eff}(2s^2nl - 2s2pnl)$  as function of  $l$  and electron temperature  $T_e$ . As can be seen from Fig. 4, the value of  $\sum_{n=9}^{n=30000} C_S^{eff}(2s^2nl - 2s2pnl)$  is increased with increasing  $l$  up to  $l = 5$  and becomes smaller for  $l = 6, 7$  than for  $l = 2$  and 4.

Sum of scaling data from  $n = 9 - 30000$  and sum of calculated results from  $n = 2 - 8$  (see Tables X and XI) are illustrated by Fig. 5. It can be seen from this figure that contribution of DR rates for excited states is responsible for total DR rate coefficient for low electron temperature but contribution of high- $n$  excited states becomes more important with increasing  $T_e$ . The curve describing contribution of these states has maximum in region of  $T_e$  around 10 eV. Resulting curve for total DR rate coefficient  $\alpha_d(2s^2)$  has two maximums in region of  $T_e$  around 1 eV and 10 eV. Our results are compared in Fig. 5 with results presented by Badnell in Ref. [6]. As can be seen from this figure the value of  $\alpha_d(2s^2)$  from [6] is almost represent only our scaling data.

Tabulated data ( $\alpha_d^{tot} = \alpha_d^a + \alpha_d^b + \alpha_d^c$ ) are given in Table VII. Contributions of  $\alpha_d^a$  and  $\alpha_d^c$  are sum from excited states with  $n=2-8$  and  $n=9-30000$ , respectively. Contribution of  $\alpha_d^b$  is from scaling of the  $2s^2nl - 2s2pnl$  transitions from  $n=9$  up to  $n = 30000$ . In Table VII, the values of  $\alpha_d^a$ ,  $\alpha_d^b$ ,  $\alpha_d^c$ , and  $\alpha_d^{tot}$  are presented as function of electron temperature  $T_e$  from 0.1 eV up to 1264.6 eV.

## VI. CONCLUSION

We calculated the state selective DR rate coefficients from the ground state of Be-like O ion to the bound states of B-like O ion in this paper. The total DR rate coefficient is in good agreement with previous work by Badnell in Ref. [6].

Energy levels, wavelengths, weighted radiative transition probabilities, and autoionization rates were calculated for B-like oxygen ion with two theoretical methods, and multi-configurational Hartree-Fock method (Cowan's code) and for limited number of states relativistic many-body perturbation theory (RMBPT). Calculated atomic data are used to obtain the dielectronic satellite lines as well as the DR rate coefficients.

We take into account doubly excited states  $2s2pnl$  and  $2p^2nl$  ( $n \geq 8, l \leq 7$ ) as intermediate resonance states with  $n$  up to 30000 to calculate the DR rate coefficients.

Most of state selective DR rate coefficients show double peaks as a function of electron temperature. The transitions through intermediate states  $2s2pnl$  make a peak in the rate

coefficients at  $T \sim 2-10$  eV.

Configuration mixing [ $2s^2nl + 2p^2nl$ ] plays an important role for the DR rate coefficients of  $2s^2nl$  levels with  $n \leq 8$  at low temperature.

The state selective rate coefficients can be used in a collisional-radiative model for investigating population kinetics and plasma diagnostics for recombining plasma. We will calculate spectral line intensities of B-like O ions by a collisional-radiative model with the DR rate coefficients obtained in this paper to compare with measurements of laboratory plasmas in elsewhere.

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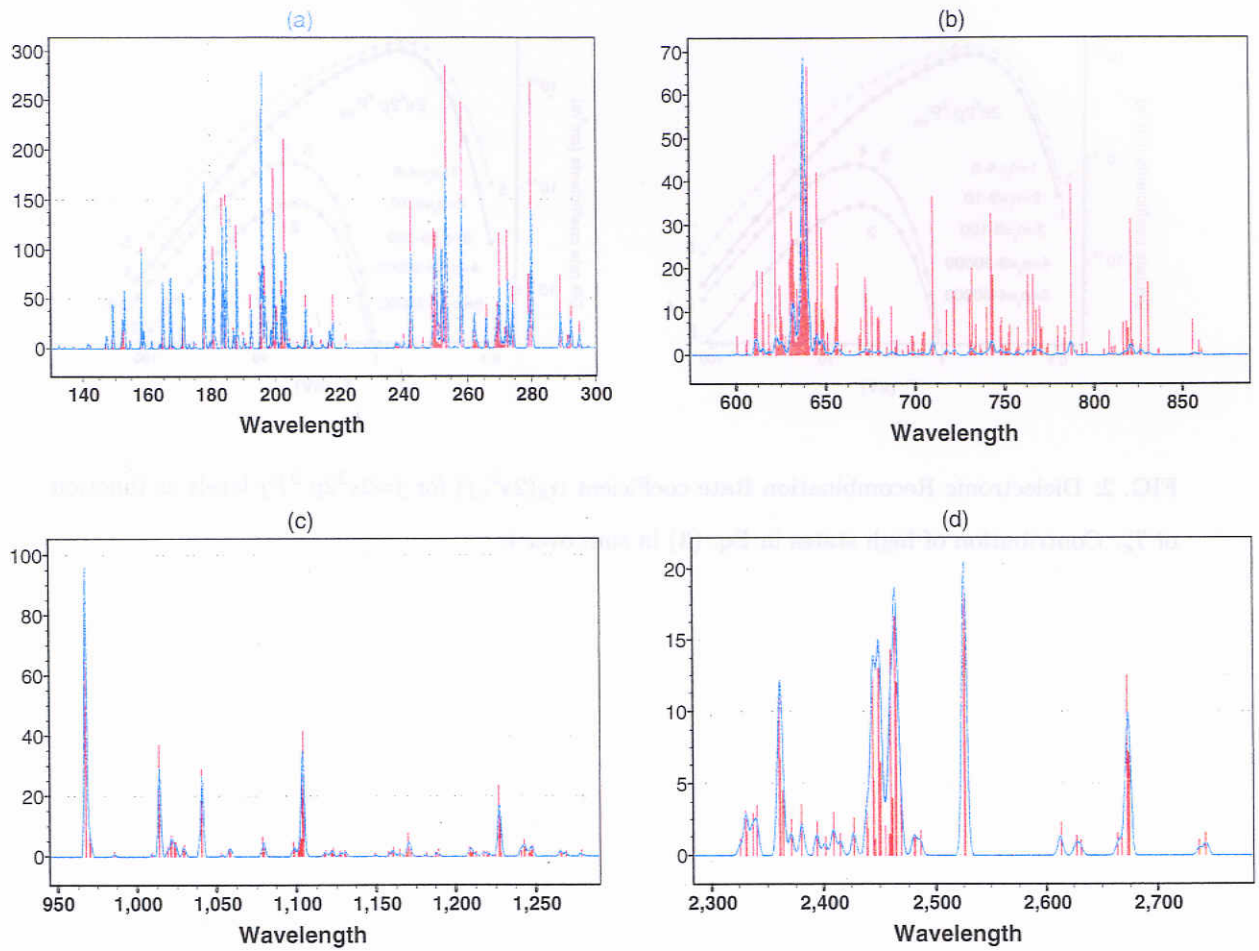


FIG. 1: Synthetic spectra of dielectronic satellite lines from  $O^{3+}$  ion at  $T_e = 10 \text{ eV}$  for  $\lambda = 140 - 360 \text{ \AA}$ ,  $\lambda = 600 - 900 \text{ \AA}$ ,  $\lambda = 950 - 1250 \text{ \AA}$ , and  $\lambda = 2300 - 2700 \text{ \AA}$ . Resolution power,  $R = \lambda/\Delta\lambda = 500$  is assumed to produce a Gaussian profile. The scale in the ordinate is in units of  $10^{-15} \text{ cm}^3/\text{s}$ .



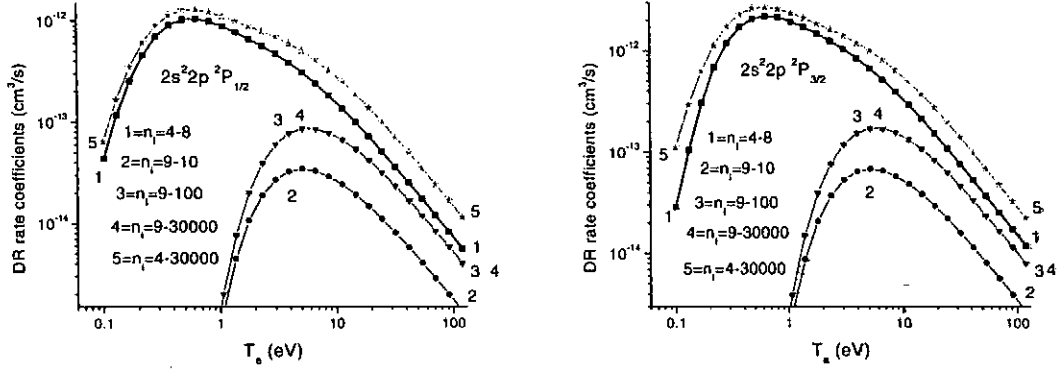


FIG. 2: Dielectronic Recombination Rate coefficient  $\alpha_d(2s^2, j)$  for  $j=2s^22p^2P_J$  levels as function of  $T_e$ . Contribution of high states in Eq. (3) in sum over  $i$ .

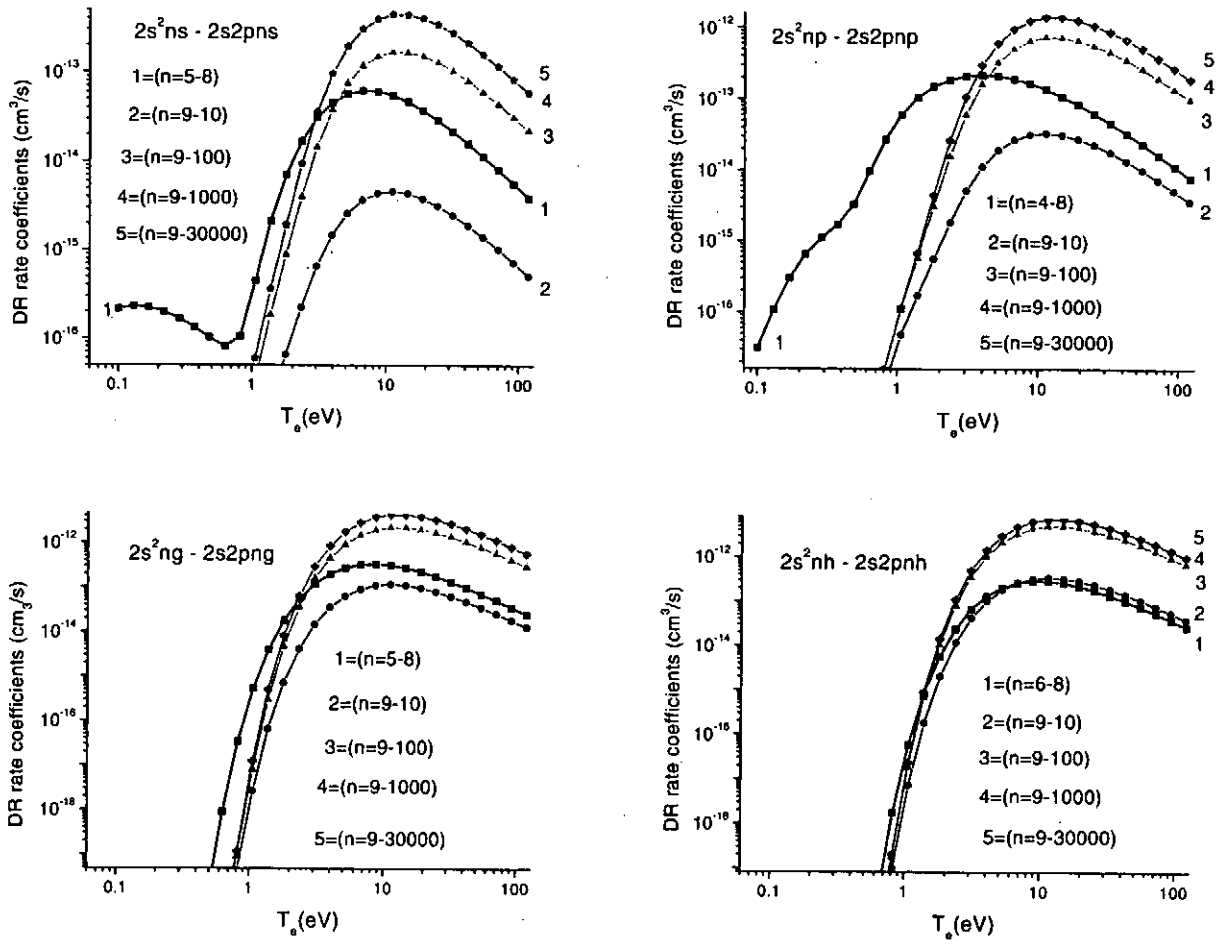


FIG. 3: The  $2s^2nl - 2s2pnl$  contributions of high states to the total DR rate coefficient in sum over  $i$  and  $j$  in Eq. (10).

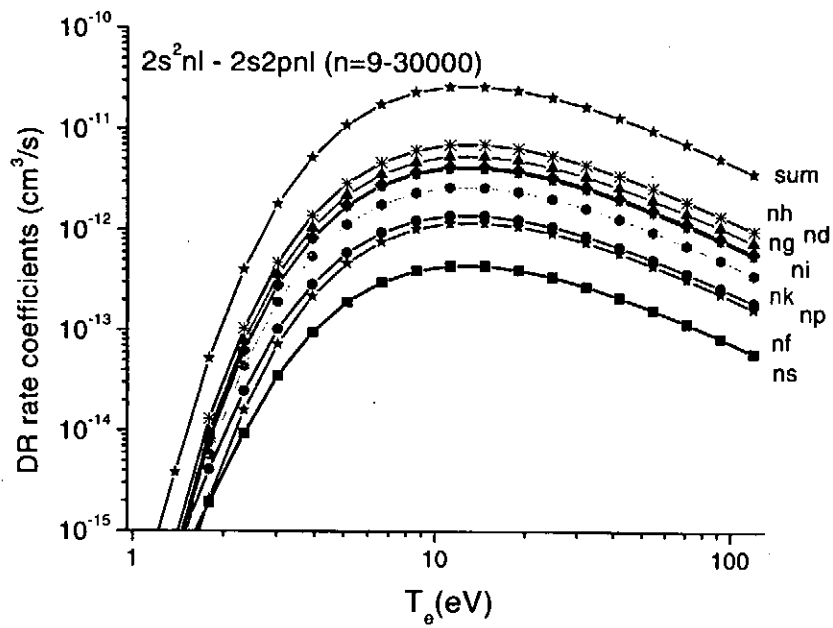


FIG. 4: The  $2s^2nl - 2s^2pnl$  contributions of high states to the total DR rate coefficient as function of  $l$  and  $T_e$  in B-like oxygen

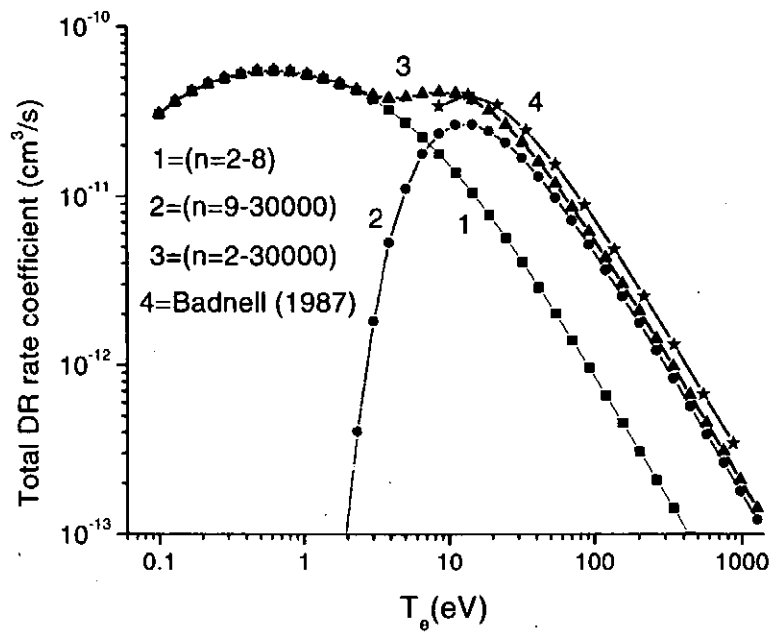


FIG. 5: Total DR rate coefficient  $\alpha_d(2s^2)$  as function of  $T_e$  in B-like oxygen. Comparison with results by Badnell in Ref.[6].

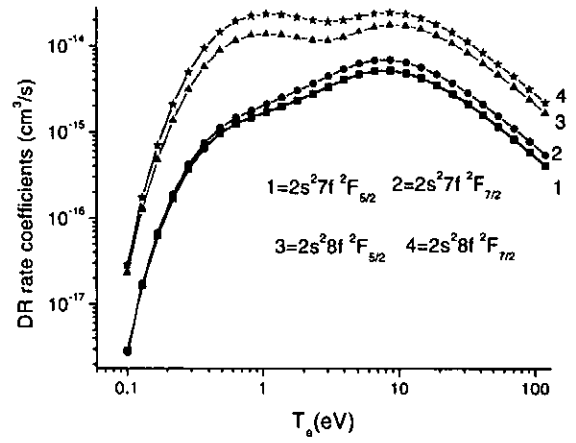
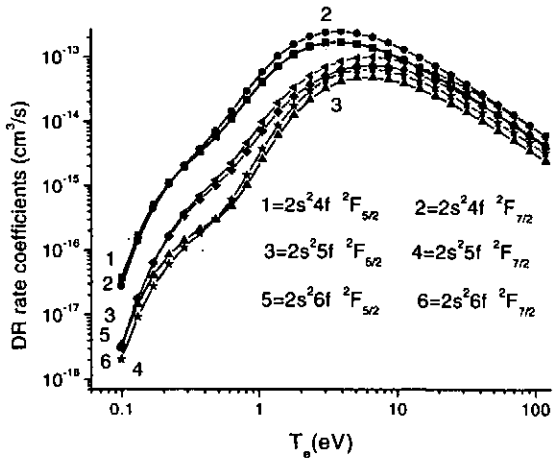
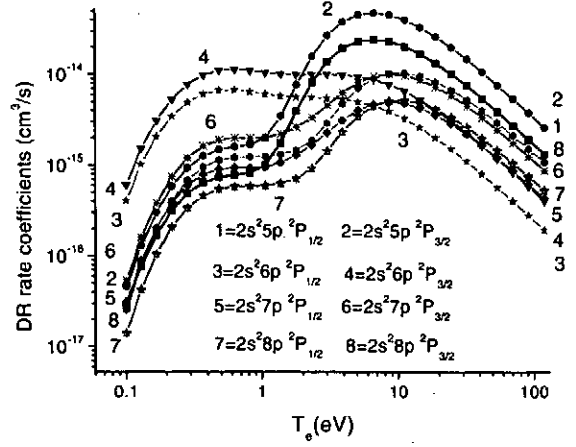
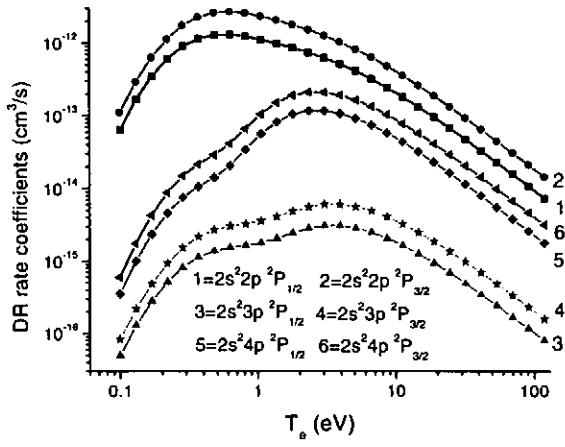


FIG. 6: DR rate coefficients  $\alpha_d(2s^2, j)$  for  $2s^2np^2P_J$  and  $2s^2nf^2F_J$  states as function of  $T_e$  in B-like oxygen

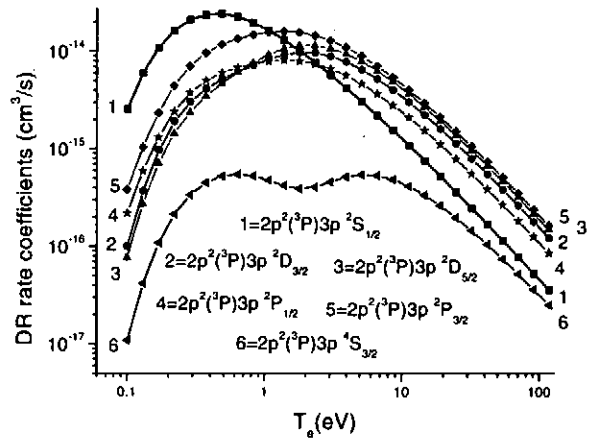
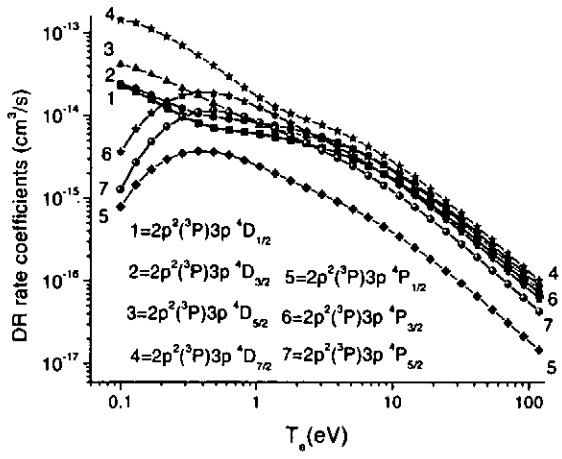
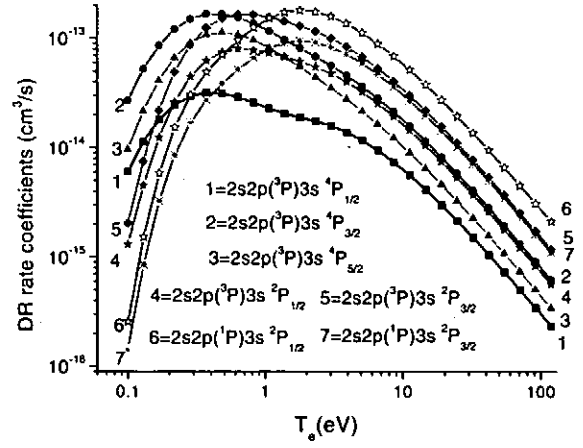
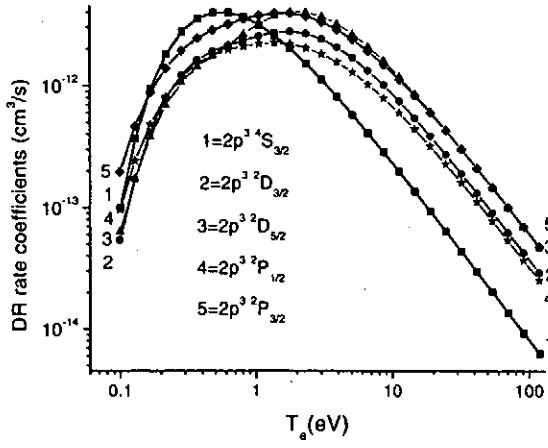


FIG. 7: DR rate coefficients  $\alpha_d(2s^2, j)$  for  $2s2p(^{1,3}P)3s\ ^{2,4}P_J$ ,  $2p^3\ ^{2,4}L_J$  and  $2p^2(^3P)3p\ ^{2,4}L_J$  levels as function of  $T_e$  in B-like oxygen

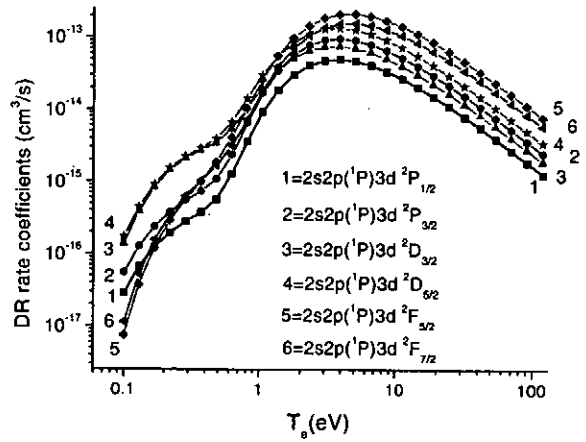
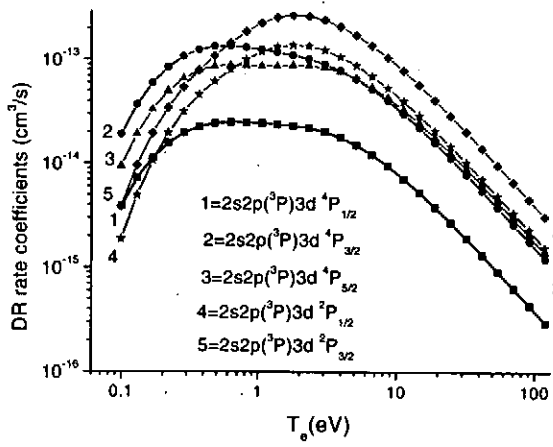
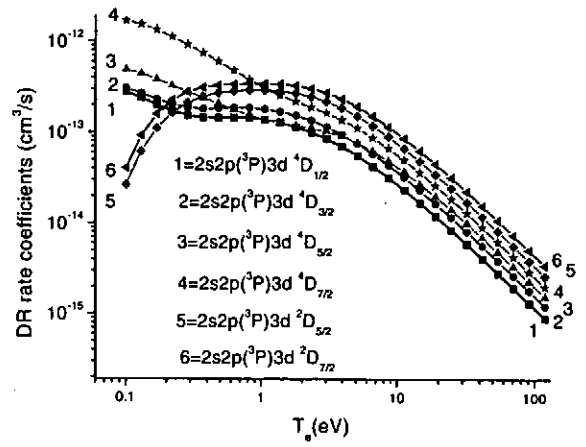
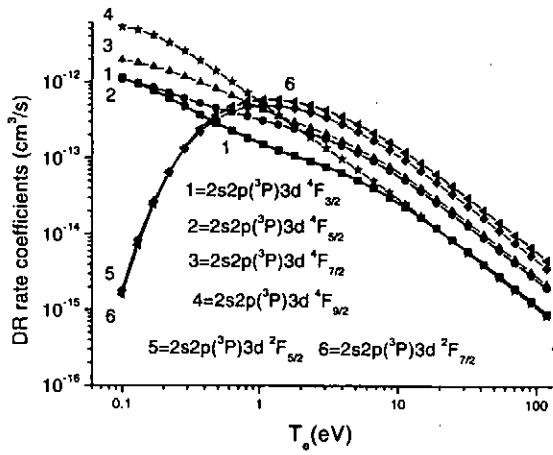


FIG. 8: DR rate coefficients  $\alpha_d(2s^2, j)$  for  $2s2p(^{1,3}P)3d$   $^{2,4}L_J$  states as function of  $T_e$  in B-like oxygen

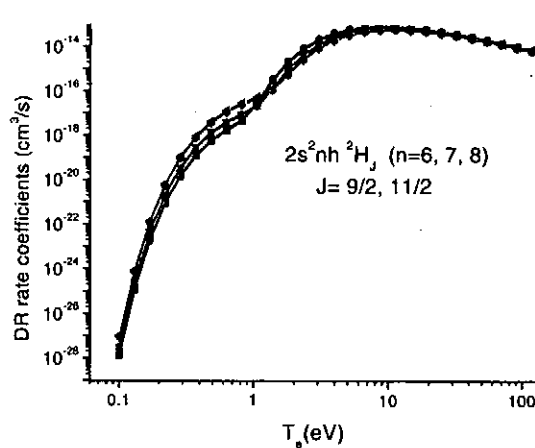
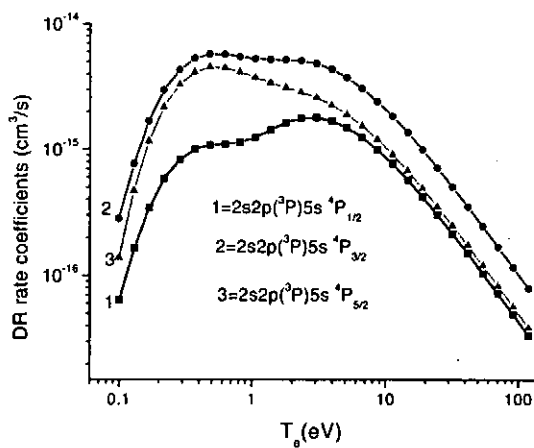
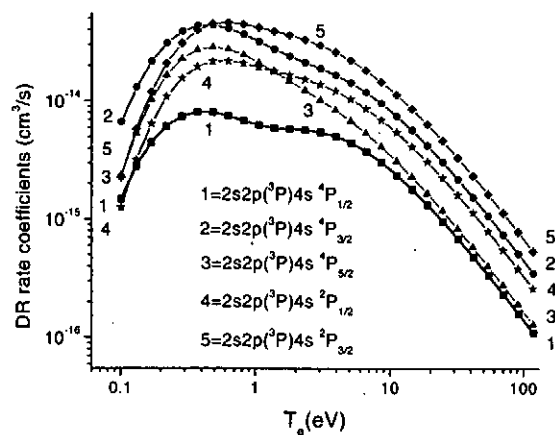
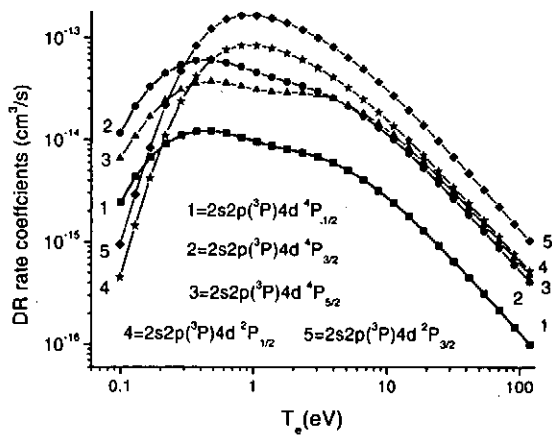
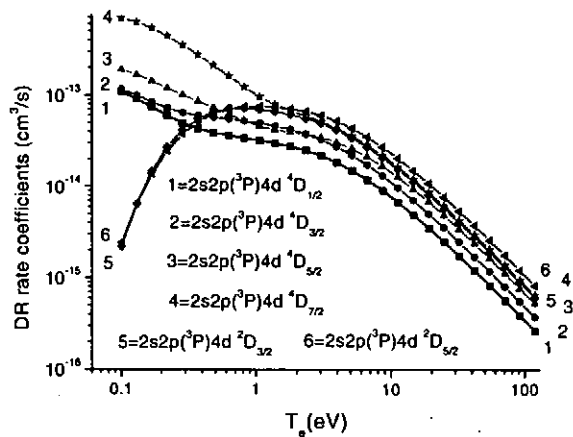
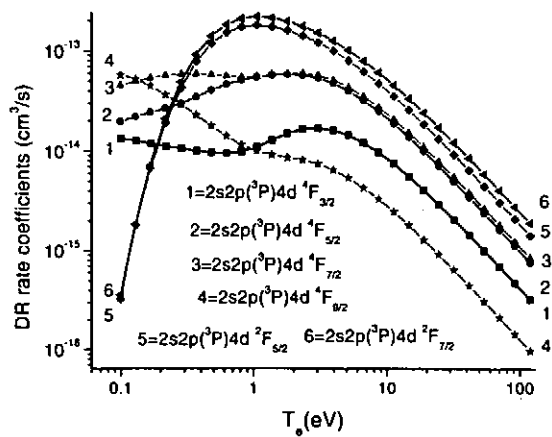


FIG. 9: DR rate coefficients  $\alpha_d(2s^2, j)$  for  $2s2p(^3P)4d\ ^{2,4}L_J$ ,  $2s2p(^3P)4s\ ^{2,4}P_J$ ,  $2s2p(^3P)5s\ ^4P_J$ , and  $2s^2nh\ ^2H_J$  states as function of  $T_e$  in B-like oxygen.



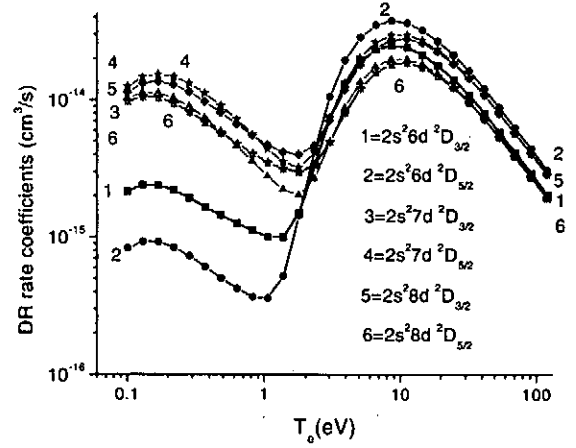
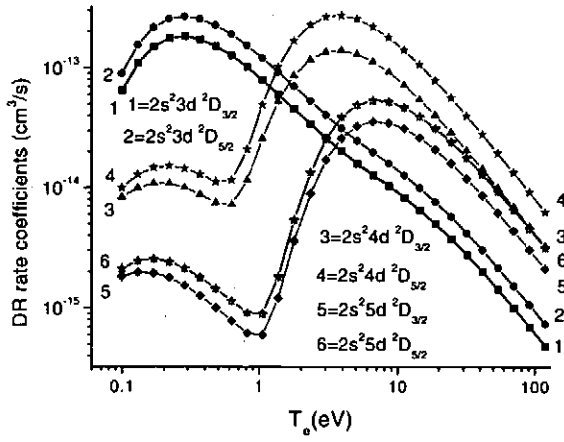
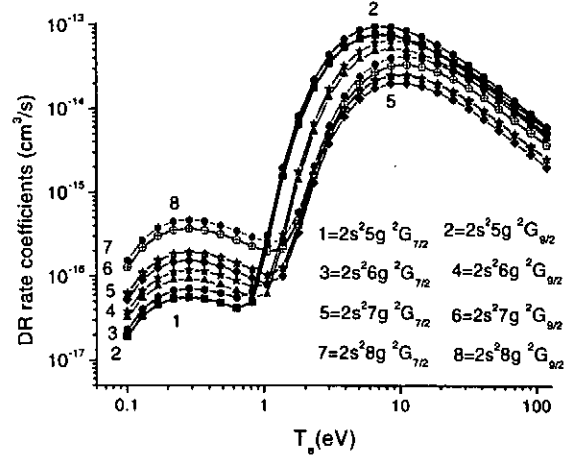
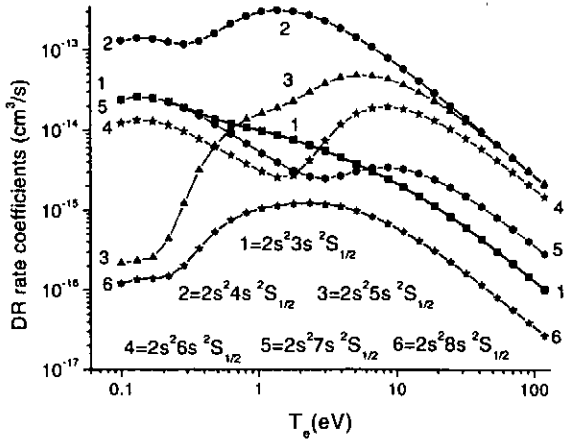


FIG. 10: DR rate coefficients  $\alpha_d(2s^2, j)$  for  $2s^2ns^2S_{1/2}$ ,  $2s^2nd^2D_J$ , and  $2s^2ng^2G_J$  states as function of  $T_e$  in B-like oxygen

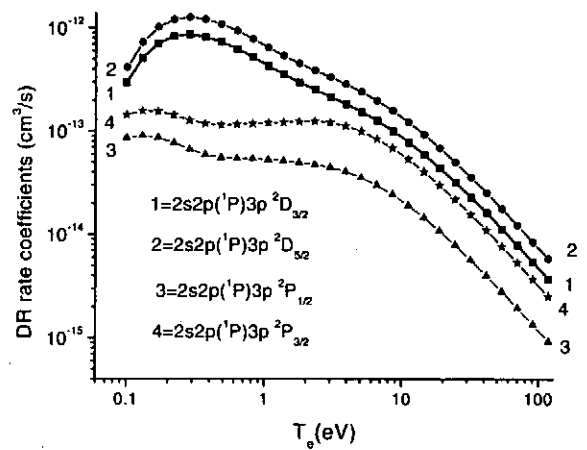
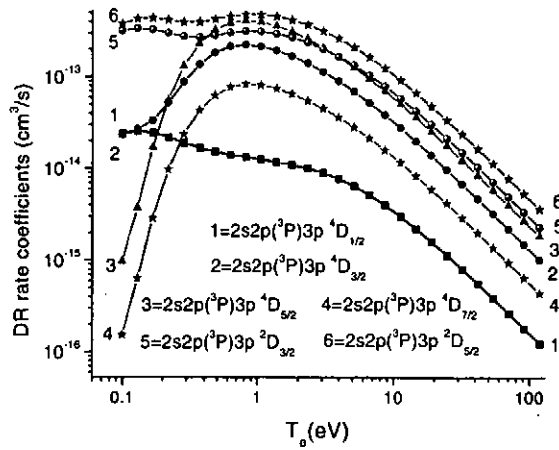
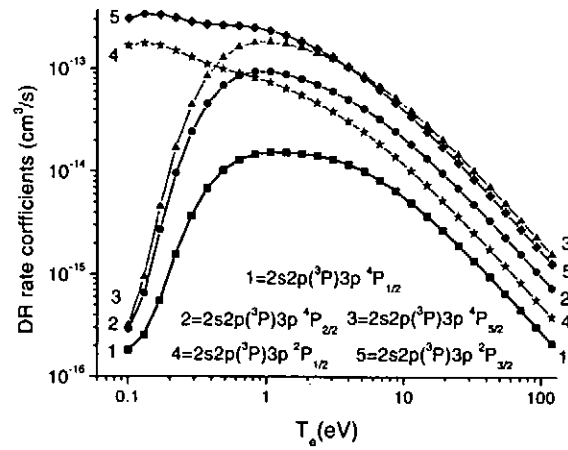
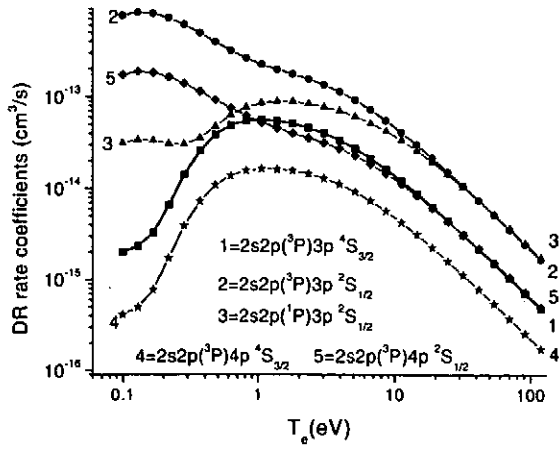


FIG. 11: DR rate coefficients  $\alpha_d(2s^2, j)$  for  $2s2p(^{1,3}P)3p^{2,4}L_J$  levels as function of  $T_e$  in B-like oxygen

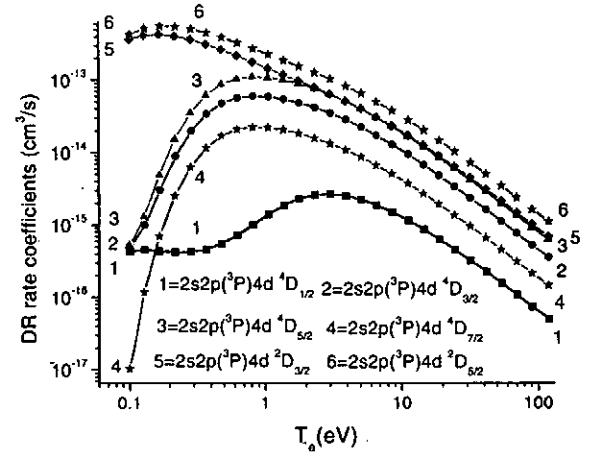
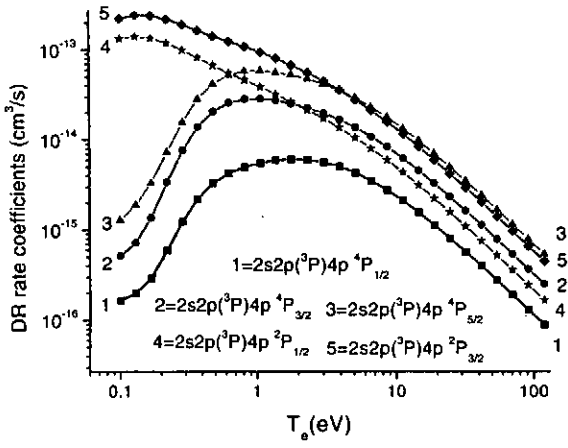
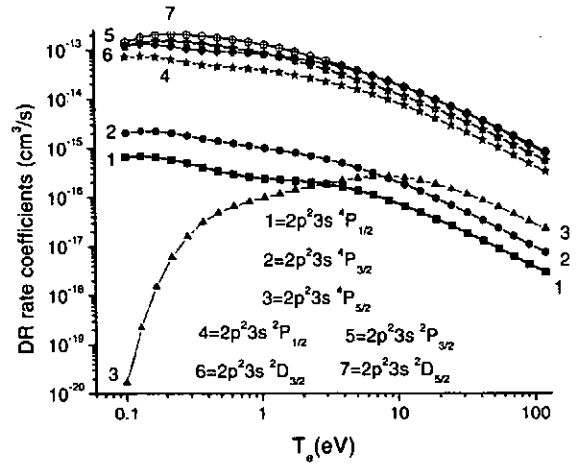
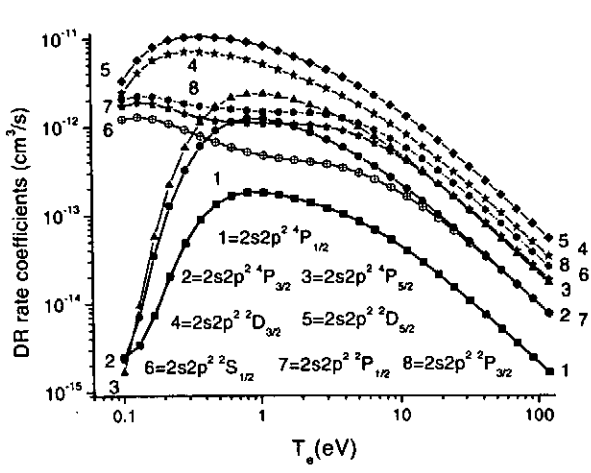


FIG. 12: DR rate coefficients  $\alpha_d(2s^2, j)$  for  $2s2p^2\ ^{2,4}L_J$ ,  $2p^23s\ ^{2,4}L_J$ , and  $2s2p(^3P)4p\ ^{2,4}L_J$  levels as function of  $T_e$  in B-like oxygen

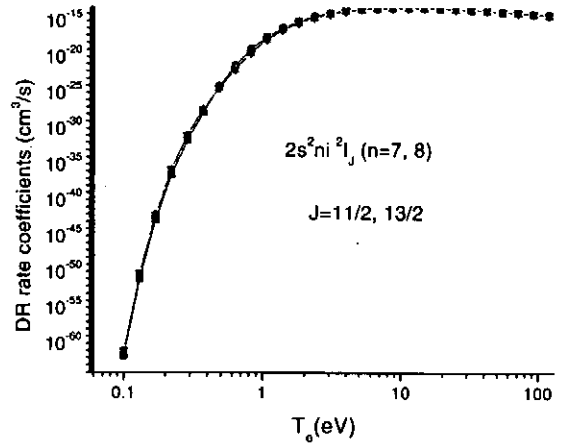
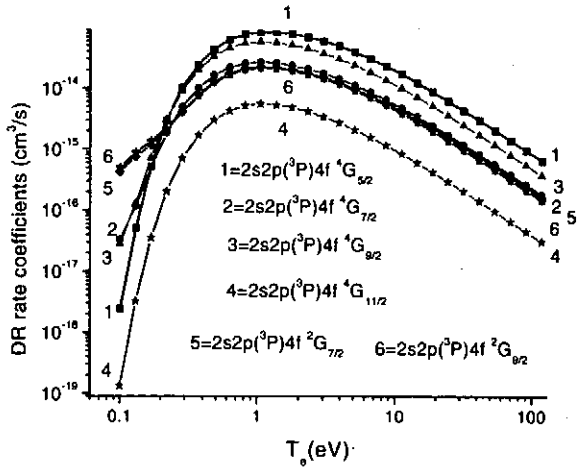
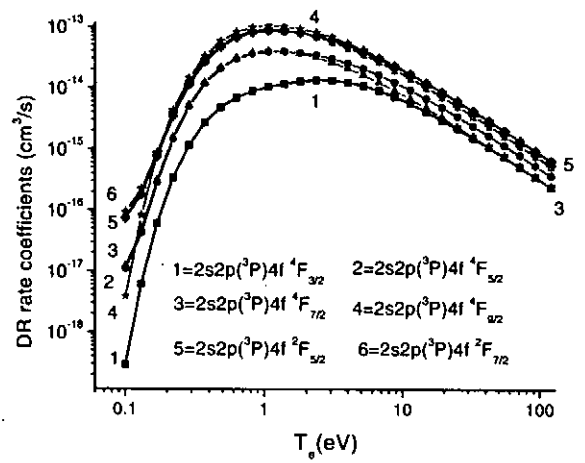
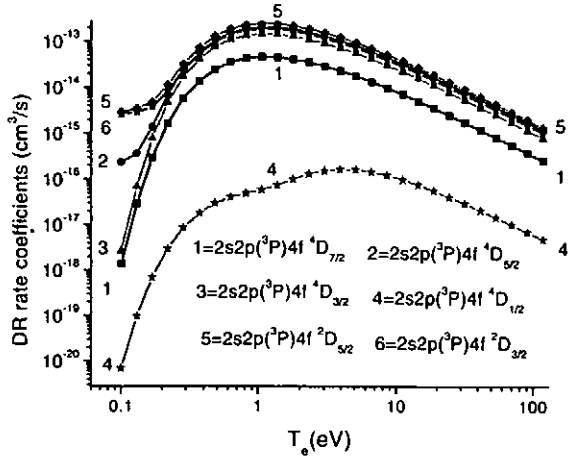


FIG. 13: DR rate coefficients  $\alpha_d(2s^2, j)$  for  $2s2p(^3P)4f\ ^{2,4}L_J$  and  $2s^2ni\ ^2I_J$  levels as function of  $T_e$  in B-like oxygen

Table I: Labeling of configurations for odd-parity and even-parity complexes

odd-parity states				even-parity states			
<i>N</i>	Conf.	<i>N</i>	Conf.	<i>N</i>	Conf.	<i>N</i>	Conf.
1	$2s^2 2p$	27	$2s 2p 6d$	1	$2s 2p^2$	27	$2s 2p 6p$
2	$2p^3$	28	$2s 2p 6g$	2	$2s^2 3s$	28	$2s 2p 6f$
3	$2s^2 3p$	29	$2s 2p 7s$	3	$2s^2 3d$	29	$2s 2p 6h$
4	$2s 2p 3s$	30	$2s 2p 7d$	4	$2s 2p 3p$	30	$2s 2p 7p$
5	$2s 2p 3d$	31	$2s 2p 7g$	5	$2p^2 3s$	31	$2s 2p 7f$
6	$2p^2 3p$	32	$2s 2p 7i$	6	$2p^2 3d$	32	$2s 2p 7h$
7	$2s^2 4p$	33	$2s 2p 8d$	7	$2s^2 4s$	33	$2s 2p 8p$
8	$2s^2 4f$	34	$2s 2p 8g$	8	$2s^2 4d$	34	$2s 2p 8f$
9	$2s^2 5p$	35	$2s 2p 8i$	9	$2s^2 5s$	35	$2s 2p 8h$
10	$2s^2 5f$	36	$2p^2 4p$	10	$2s^2 5d$	36	$2s 2p 7k$
11	$2s^2 6p$	37	$2p^2 4f$	11	$2s^2 5g$	37	$2p^2 4s$
12	$2s^2 6f$	38	$2p^2 5p$	12	$2s^2 6s$	38	$2p^2 4d$
13	$2s^2 6h$	39	$2p^2 5f$	13	$2s^2 6d$	39	$2p^2 5s$
14	$2s^2 7p$	40	$2p^2 6p$	14	$2s^2 6g$	40	$2p^2 5d$
15	$2s^2 7f$	41	$2p^2 6f$	15	$2s^2 7s$	41	$2p^2 5g$
16	$2s^2 7h$	42	$2p^2 6h$	16	$2s^2 7d$	42	$2p^2 6s$
17	$2s^2 8p$	43	$2p^2 7p$	17	$2s^2 7g$	43	$2p^2 6d$
18	$2s^2 8f$	44	$2p^2 7f$	18	$2s^2 7i$	44	$2p^2 6g$
19	$2s^2 8h$	45	$2p^2 7h$	19	$2s^2 8s$	45	$2p^2 7s$
20	$2s^2 8k$	46	$2p^2 8p$	20	$2s^2 8d$	46	$2p^2 7d$
21	$2s 2p 4s$	47	$2p^2 8f$	21	$2s^2 8g$	47	$2p^2 7g$
22	$2s 2p 4d$	48	$2p^2 8h$	22	$2s^2 8i$	48	$2p^2 7i$
23	$2s 2p 5s$	49	$2p^2 8k$	23	$2s 2p 4p$	49	$2p^2 8s$
24	$2s 2p 5d$	50	$2s 2p 8s$	24	$2s 2p 4f$	50	$2p^2 8d$
25	$2s 2p 5g$			25	$2s 2p 5p$	51	$2p^2 8g$
26	$2s 2p 6s$			26	$2s 2p 5f$	52	$2p^2 8i$

Table II: Energies ( $10^3 \text{ cm}^{-1}$ ) for excited states of B-like O. Comparison of theoretical results (Cowan and RMBPT codes) with recommended NIST in Ref. 23.

Conf.	Level		E ( $10^3 \text{ cm}^{-1}$ )			Conf.	Level		E ( $10^3 \text{ cm}^{-1}$ )		
	<i>LSJ</i>		Cowan	RMBPT	NIST		<i>LSJ</i>		Cowan	RMBPT	NIST
$2s^2 2p$	( <sup>1</sup> S)	<sup>2</sup> P <sub>1/2</sub>	0.000	0.000	0.000	$2s 2p 3d$	( <sup>3</sup> P)	<sup>2</sup> F <sub>7/2</sub>	509.920	510.387	510.975
$2s^2 2p$	( <sup>1</sup> S)	<sup>2</sup> P <sub>3/2</sub>	0.382	0.389	0.386	$2s 2p 3d$	( <sup>3</sup> P)	<sup>2</sup> F <sub>5/2</sub>	511.955	516.772	514.222
$2s 2p^2$	( <sup>3</sup> P)	<sup>4</sup> P <sub>1/2</sub>	72.656	72.107	71.440	$2s 2p 3d$	( <sup>3</sup> P)	<sup>2</sup> P <sub>1/2</sub>	512.086	516.639	514.371
$2s 2p^2$	( <sup>3</sup> P)	<sup>4</sup> P <sub>3/2</sub>	72.785	72.241	71.570	$2s 2p 3s$	( <sup>1</sup> P)	<sup>2</sup> P <sub>3/2</sub>	516.702	519.661	518.699
$2s 2p^2$	( <sup>3</sup> P)	<sup>4</sup> P <sub>5/2</sub>	72.999	72.434	71.756	$2s 2p 3s$	( <sup>1</sup> P)	<sup>2</sup> P <sub>1/2</sub>	516.712	519.655	518.709
$2s 2p^2$	( <sup>1</sup> D)	<sup>2</sup> D <sub>3/2</sub>	126.805	126.110	126.936	$2s 2p 3p$	( <sup>1</sup> P)	<sup>2</sup> D <sub>3/2</sub>	546.212	547.823	547.326
$2s 2p^2$	( <sup>1</sup> D)	<sup>2</sup> D <sub>5/2</sub>	126.807	126.098	126.950	$2s 2p 3p$	( <sup>1</sup> P)	<sup>2</sup> D <sub>5/2</sub>	546.235	547.848	547.355
$2s 2p^2$	( <sup>1</sup> S)	<sup>2</sup> S <sub>1/2</sub>	160.025	164.788	164.367	$2s 2p 3p$	( <sup>1</sup> P)	<sup>2</sup> P <sub>1/2</sub>	547.805	550.879	549.792
$2s 2p^2$	( <sup>3</sup> P)	<sup>2</sup> P <sub>1/2</sub>	175.877	179.035	180.481	$2s 2p 3p$	( <sup>1</sup> P)	<sup>2</sup> P <sub>3/2</sub>	547.871	550.944	549.855
$2s 2p^2$	( <sup>3</sup> P)	<sup>2</sup> P <sub>3/2</sub>	176.131	179.284	180.724	$2s 2p 3p$	( <sup>1</sup> P)	<sup>2</sup> S <sub>1/2</sub>	553.493	551.303	554.464
$2p^3$	( <sup>4</sup> S)	<sup>4</sup> S <sub>3/2</sub>	233.450	231.813	231.538	$2s 2p 3d$	( <sup>1</sup> P)	<sup>2</sup> F <sub>7/2</sub>	571.546	569.426	570.797
$2p^3$	( <sup>2</sup> D)	<sup>2</sup> D <sub>3/2</sub>	259.428	253.873	255.185	$2s 2p 3d$	( <sup>1</sup> P)	<sup>2</sup> D <sub>3/2</sub>	573.643	577.430	575.819
$2p^3$	( <sup>2</sup> D)	<sup>2</sup> D <sub>5/2</sub>	259.433	253.849	255.155	$2s 2p 3d$	( <sup>1</sup> P)	<sup>2</sup> D <sub>5/2</sub>	573.670	577.460	575.853
$2p^3$	( <sup>2</sup> P)	<sup>2</sup> P <sub>1/2</sub>	289.438	287.900	289.015	$2p^2 3s$	( <sup>3</sup> P)	<sup>4</sup> P <sub>1/2</sub>	575.276	578.522	576.853
$2p^3$	( <sup>2</sup> P)	<sup>2</sup> P <sub>3/2</sub>	289.454	287.912	289.023	$2p^2 3s$	( <sup>3</sup> P)	<sup>4</sup> P <sub>3/2</sub>	575.417	578.667	576.997
$2s^2 3s$	( <sup>1</sup> S)	<sup>2</sup> S <sub>1/2</sub>	356.467	360.142	357.614	$2p^2 3s$	( <sup>3</sup> P)	<sup>4</sup> P <sub>5/2</sub>	575.662	578.888	577.209
$2s^2 3p$	( <sup>1</sup> S)	<sup>2</sup> P <sub>1/2</sub>	390.075	392.569	390.161	$2s 2p 3d$	( <sup>1</sup> P)	<sup>2</sup> P <sub>1/2</sub>	580.241	580.873	581.721
$2s^2 3p$	( <sup>1</sup> S)	<sup>2</sup> P <sub>3/2</sub>	390.161	392.656	390.248	$2s 2p 3d$	( <sup>1</sup> P)	<sup>2</sup> P <sub>3/2</sub>	580.258	580.899	581.743
$2s^2 3d$	( <sup>1</sup> S)	<sup>2</sup> D <sub>3/2</sub>	419.025	422.705	419.534	$2p^2 3s$	( <sup>3</sup> P)	<sup>2</sup> P <sub>1/2</sub>	595.187	588.486	594.340
$2s^2 3d$	( <sup>1</sup> S)	<sup>2</sup> D <sub>5/2</sub>	419.039	422.720	419.551	$2p^2 3s$	( <sup>3</sup> P)	<sup>2</sup> P <sub>3/2</sub>	595.403	588.751	594.538
$2s 2p 3s$	( <sup>3</sup> P)	<sup>4</sup> P <sub>1/2</sub>	437.390	440.951	438.849	$2p^2 3p$	( <sup>3</sup> P)	<sup>2</sup> S <sub>1/2</sub>	595.629	598.909	597.255
$2s 2p 3s$	( <sup>3</sup> P)	<sup>4</sup> P <sub>3/2</sub>	437.537	441.087	438.984	$2p^2 3s$	( <sup>1</sup> D)	<sup>2</sup> D <sub>3/2</sub>	603.410	598.460	600.092
$2s 2p 3s$	( <sup>3</sup> P)	<sup>4</sup> P <sub>5/2</sub>	437.784	441.335	439.231	$2p^2 3s$	( <sup>1</sup> D)	<sup>2</sup> D <sub>5/2</sub>	603.438	598.467	600.106
$2s 2p 3s$	( <sup>3</sup> P)	<sup>2</sup> P <sub>1/2</sub>	451.787	454.345	452.807	$2p^2 3p$	( <sup>3</sup> P)	<sup>4</sup> D <sub>3/2</sub>	600.950	604.210	602.962
$2s 2p 3s$	( <sup>3</sup> P)	<sup>2</sup> P <sub>3/2</sub>	452.060	454.609	453.072	$2p^2 3p$	( <sup>3</sup> P)	<sup>4</sup> D <sub>5/2</sub>	601.088	604.350	603.077
$2s 2p 3p$	( <sup>3</sup> P)	<sup>2</sup> P <sub>1/2</sub>	466.545	468.608	467.229	$2p^2 3p$	( <sup>3</sup> P)	<sup>4</sup> D <sub>7/2</sub>	601.283	604.977	603.227
$2s 2p 3p$	( <sup>3</sup> P)	<sup>2</sup> P <sub>3/2</sub>	466.638	468.724	467.345	$2p^2 3p$	( <sup>3</sup> P)	<sup>4</sup> P <sub>1/2</sub>	604.097	607.379	606.530
$2s 2p 3p$	( <sup>3</sup> P)	<sup>4</sup> D <sub>1/2</sub>	466.219	470.283	468.337	$2p^2 3p$	( <sup>3</sup> P)	<sup>4</sup> P <sub>3/2</sub>	604.179	607.452	606.578
$2s 2p 3p$	( <sup>3</sup> P)	<sup>4</sup> D <sub>3/2</sub>	466.331	470.363	468.415	$2p^2 3p$	( <sup>3</sup> P)	<sup>4</sup> P <sub>5/2</sub>	604.319	607.584	606.694
$2s 2p 3p$	( <sup>3</sup> P)	<sup>4</sup> D <sub>5/2</sub>	466.501	470.502	468.551	$2p^2 3p$	( <sup>3</sup> P)	<sup>2</sup> P <sub>1/2</sub>	614.902	615.353	615.431
$2s 2p 3p$	( <sup>3</sup> P)	<sup>4</sup> D <sub>7/2</sub>	466.707	470.713	468.760	$2p^2 3p$	( <sup>3</sup> P)	<sup>2</sup> P <sub>3/2</sub>	614.930	615.229	615.460
$2s 2p 3p$	( <sup>3</sup> P)	<sup>4</sup> S <sub>3/2</sub>	471.241	476.727	474.476	$2p^2 3p$	( <sup>3</sup> P)	<sup>4</sup> S <sub>3/2</sub>	616.930	618.889	616.888
$2s 2p 3p$	( <sup>3</sup> P)	<sup>4</sup> P <sub>1/2</sub>	479.401	481.350	478.849	$2p^2 3p$	( <sup>1</sup> D)	<sup>2</sup> F <sub>5/2</sub>	627.652	624.165	624.876
$2s 2p 3p$	( <sup>3</sup> P)	<sup>4</sup> P <sub>3/2</sub>	479.493	481.445	478.943	$2p^2 3p$	( <sup>1</sup> D)	<sup>2</sup> F <sub>7/2</sub>	627.714	624.229	624.876
$2s 2p 3p$	( <sup>3</sup> P)	<sup>4</sup> P <sub>5/2</sub>	479.636	481.577	479.072	$2p^2 3d$	( <sup>3</sup> P)	<sup>2</sup> F <sub>5/2</sub>	630.719	631.013	630.095
$2s 2p 3p$	( <sup>3</sup> P)	<sup>2</sup> D <sub>3/2</sub>	482.678	483.979	482.666	$2p^2 3d$	( <sup>3</sup> P)	<sup>2</sup> F <sub>7/2</sub>	630.882	631.274	630.095
$2s 2p 3p$	( <sup>3</sup> P)	<sup>2</sup> D <sub>5/2</sub>	482.944	484.233	482.922	$2p^2 3d$	( <sup>3</sup> P)	<sup>2</sup> P <sub>3/2</sub>	631.521	633.876	632.426
$2s 2p 3p$	( <sup>3</sup> P)	<sup>2</sup> S <sub>1/2</sub>	492.338	492.917	492.891	$2p^2 3d$	( <sup>3</sup> P)	<sup>2</sup> P <sub>1/2</sub>	631.577	634.114	632.597
$2s 2p 3d$	( <sup>3</sup> P)	<sup>4</sup> F <sub>3/2</sub>	494.529	498.143	495.169	$2p^2 3d$	( <sup>3</sup> P)	<sup>4</sup> P <sub>5/2</sub>	634.863	639.098	637.113
$2s 2p 3d$	( <sup>3</sup> P)	<sup>4</sup> F <sub>5/2</sub>	494.613	498.221	495.246	$2p^2 3d$	( <sup>3</sup> P)	<sup>4</sup> P <sub>3/2</sub>	634.947	639.203	637.212
$2s 2p 3d$	( <sup>3</sup> P)	<sup>4</sup> F <sub>7/2</sub>	494.734	498.337	495.360	$2p^2 3d$	( <sup>3</sup> P)	<sup>4</sup> P <sub>1/2</sub>	634.997	639.264	637.274
$2s 2p 3d$	( <sup>3</sup> P)	<sup>4</sup> F <sub>9/2</sub>	494.893	498.495	495.513	$2p^2 3d$	( <sup>1</sup> D)	<sup>2</sup> G <sub>7/2</sub>	649.306	646.564	643.642
$2s 2p 3d$	( <sup>3</sup> P)	<sup>4</sup> D <sub>1/2</sub>	498.267	502.391	499.767	$2p^2 3d$	( <sup>1</sup> D)	<sup>2</sup> G <sub>9/2</sub>	649.316	646.581	643.642
$2s 2p 3d$	( <sup>3</sup> P)	<sup>4</sup> D <sub>3/2</sub>	498.293	502.421	499.796	$2p^2 3d$	( <sup>3</sup> P)	<sup>2</sup> D <sub>3/2</sub>	646.629	642.796	646.859
$2s 2p 3d$	( <sup>3</sup> P)	<sup>4</sup> D <sub>5/2</sub>	498.339	502.469	499.843	$2p^2 3d$	( <sup>3</sup> P)	<sup>2</sup> D <sub>5/2</sub>	646.650	642.838	646.859
$2s 2p 3d$	( <sup>3</sup> P)	<sup>4</sup> D <sub>7/2</sub>	498.411	502.534	499.907	$2p^2 3d$	( <sup>1</sup> D)	<sup>2</sup> F <sub>7/2</sub>	653.673	647.711	651.117
$2s 2p 3d$	( <sup>3</sup> P)	<sup>2</sup> D <sub>3/2</sub>	500.963	503.571	501.509	$2p^2 3d$	( <sup>1</sup> D)	<sup>2</sup> F <sub>5/2</sub>	653.712	647.766	651.098
$2s 2p 3d$	( <sup>3</sup> P)	<sup>2</sup> D <sub>5/2</sub>	501.018	503.629	501.564	$2p^2 3d$	( <sup>1</sup> D)	<sup>2</sup> D <sub>3/2</sub>	654.054	656.412	653.411
$2s 2p 3d$	( <sup>3</sup> P)	<sup>4</sup> P <sub>5/2</sub>	501.694	507.849	504.096	$2p^2 3d$	( <sup>1</sup> D)	<sup>2</sup> D <sub>5/2</sub>	654.148	656.364	653.328
$2s 2p 3d$	( <sup>3</sup> P)	<sup>4</sup> P <sub>3/2</sub>	501.795	507.964	504.209	$2p^2 3d$	( <sup>1</sup> D)	<sup>2</sup> P <sub>1/2</sub>	665.835	661.557	659.998
$2s 2p 3d$	( <sup>3</sup> P)	<sup>4</sup> P <sub>1/2</sub>	501.859	508.034	504.283	$2p^2 3d$	( <sup>1</sup> D)	<sup>2</sup> P <sub>3/2</sub>	665.901	661.656	659.998
$2s 2p 3d$	( <sup>3</sup> P)	<sup>2</sup> F <sub>5/2</sub>	509.678	510.146	510.745	$2p^2 3d$	( <sup>1</sup> S)	<sup>2</sup> D <sub>5/2</sub>	701.879	703.774	706.333

Table III: Energy ( $10^3 \text{ cm}^{-1}$ ) and sum of weighted radiative transition probabilities ( $\sum(gA_r)$  in  $\text{s}^{-1}$ ) for excited states of B-like O. Comparison of theoretical results (Cowan code) with recommended NIST data in Ref. 23.

Conf.	Level	E ( $10^3 \text{ cm}^{-1}$ )		$\sum(gA_r)$	Conf.	Level	E ( $10^3 \text{ cm}^{-1}$ )		$\sum(gA_r)$
	LSJ	Cowan	NIST	Cowan		LSJ	Cowan	NIST	Cowan
$2s^24s$	$(1S)^2S_{1/2}$	486.625	485.822	3.232[09]	$2s2p4d$	$(3P)^4P_{5/2}$	593.410	593.273	8.619[10]
$2s^24p$	$(1S)^2P_{1/2}$	501.586	499.995	3.225[09]	$2s2p4d$	$(3P)^4P_{3/2}$	593.526	593.406	5.736[10]
$2s^24p$	$(1S)^2P_{3/2}$	501.629	500.038	6.471[09]	$2s2p4d$	$(3P)^4P_{1/2}$	593.588	593.473	2.858[10]
$2s^24d$	$(1S)^2D_{3/2}$	511.899	510.570	5.508[10]	$2s2p4d$	$(3P)^2D_{3/2}$	594.270	593.627	5.565[10]
$2s^24d$	$(1S)^2D_{5/2}$	511.905	510.574	8.243[10]	$2s2p4d$	$(3P)^2D_{5/2}$	594.352	593.708	8.348[10]
$2s^24f$	$(1S)^2F_{5/2}$	514.114	513.187	2.163[10]	$2s2p4f$	$(3P)^4F_{3/2}$	594.275	593.949	1.383[10]
$2s^24f$	$(1S)^2F_{7/2}$	514.122	513.199	2.870[10]	$2s2p4f$	$(3P)^4F_{5/2}$	594.287	593.962	2.169[10]
$2s^25s$	$(1S)^2S_{1/2}$	540.979	539.368	1.249[10]	$2s2p4f$	$(3P)^4F_{7/2}$	594.312	593.993	2.889[10]
$2s^25p$	$(1S)^2P_{1/2}$	548.351	546.803	2.279[09]	$2s2p4f$	$(3P)^4F_{9/2}$	594.376	594.045	3.463[10]
$2s^25p$	$(1S)^2P_{3/2}$	548.368	546.819	4.552[09]	$2s2p4f$	$(3P)^2F_{5/2}$	594.330	594.019	2.776[10]
$2s^25d$	$(1S)^2D_{3/2}$	553.524	552.030	2.937[10]	$2s2p4f$	$(3P)^2F_{7/2}$	594.401	594.074	3.704[10]
$2s^25d$	$(1S)^2D_{5/2}$	553.527	552.032	4.393[10]	$2s2p4d$	$(3P)^2F_{5/2}$	597.120	596.295	1.112[11]
$2s^25f$	$(1S)^2F_{5/2}$	553.892	552.495	1.598[10]	$2s2p4d$	$(3P)^2F_{7/2}$	597.329	596.475	1.415[11]
$2s^25f$	$(1S)^2F_{7/2}$	553.893	552.495	2.118[10]	$2s2p4f$	$(3P)^4G_{5/2}$	596.334	596.330	2.520[10]
$2s^25g$	$(1S)^2G_{9/2}$	555.467	554.002	1.124[10]	$2s2p4f$	$(3P)^4G_{7/2}$	596.404	596.402	3.365[10]
$2s^25g$	$(1S)^2G_{7/2}$	555.467	554.002	8.996[09]	$2s2p4f$	$(3P)^4G_{9/2}$	596.520	596.510	4.221[10]
$2s2p4s$	$(3P)^4P_{1/2}$	569.416	568.901	1.132[10]	$2s2p4f$	$(3P)^4G_{11/2}$	596.668	596.655	5.095[10]
$2s2p4s$	$(3P)^4P_{3/2}$	569.563	569.036	2.269[10]	$2s2p4f$	$(3P)^4D_{7/2}$	596.214	596.331	2.947[10]
$2s2p4s$	$(3P)^4P_{5/2}$	569.815	569.283	3.419[10]	$2s2p4f$	$(3P)^4D_{5/2}$	596.307	596.444	2.245[10]
$2s^26s$	$(1S)^2S_{1/2}$	569.928		1.936[09]	$2s2p4f$	$(3P)^4D_{3/2}$	596.392	596.512	1.474[10]
$2s^26p$	$(1S)^2P_{1/2}$	571.631		9.963[09]	$2s2p4f$	$(3P)^4D_{1/2}$	596.442	596.566	7.359[09]
$2s^26p$	$(1S)^2P_{3/2}$	571.737		1.935[10]	$2s2p4f$	$(3P)^2G_{7/2}$	596.732	596.632	2.910[10]
$2s2p4s$	$(3P)^2P_{1/2}$	574.859	573.696	4.786[09]	$2s2p4f$	$(3P)^2G_{9/2}$	596.952	596.848	3.620[10]
$2s2p4s$	$(3P)^2P_{3/2}$	575.056	573.901	1.020[10]	$2s2p4f$	$(3P)^2D_{5/2}$	596.568	596.658	2.388[10]
$2s^26d$	$(1S)^2D_{3/2}$	575.893	574.369	1.901[10]	$2s2p4f$	$(3P)^2D_{3/2}$	596.715	596.798	1.594[10]
$2s^26d$	$(1S)^2D_{5/2}$	575.896	574.369	2.803[10]	$2s2p4d$	$(3P)^2P_{3/2}$	598.136	597.720	5.649[10]
$2s^26f$	$(1S)^2F_{5/2}$	578.744	574.808	4.519[10]	$2s2p4d$	$(3P)^2P_{1/2}$	598.283	597.869	2.824[10]
$2s^26f$	$(1S)^2F_{7/2}$	578.745	574.808	6.007[10]	$2s2p5p$	$(3P)^2P_{1/2}$	628.590		2.164[10]
$2s2p4p$	$(3P)^2P_{1/2}$	575.757	575.202	2.327[10]	$2s2p5p$	$(3P)^4S_{3/2}$	629.877	628.539	4.949[09]
$2s2p4p$	$(3P)^2P_{3/2}$	575.951	575.375	4.610[10]	$2s2p5p$	$(3P)^2D_{3/2}$	631.849	630.648	2.012[10]
$2s^26g$	$(1S)^2G_{9/2}$	576.993	575.507	6.542[09]	$2s2p5p$	$(3P)^2D_{5/2}$	632.067	630.879	2.897[10]
$2s^26g$	$(1S)^2G_{7/2}$	576.993	575.507	5.234[09]	$2s2p5d$	$(3P)^4D_{1/2}$	634.659		2.114[10]
$2s^26h$	$(1S)^2H_{11/2}$	577.128	575.585	5.087[09]	$2s2p5d$	$(3P)^4D_{7/2}$	634.819	634.182	8.352[10]
$2s^26h$	$(1S)^2H_{9/2}$	577.128	575.585	4.239[09]	$2s2p5d$	$(3P)^4F_{5/2}$	635.097	634.523	4.407[10]
$2s2p4p$	$(3P)^2D_{3/2}$	585.477	584.541	2.783[10]	$2s2p5d$	$(3P)^4P_{3/2}$	635.176	634.622	2.747[10]
$2s2p4p$	$(3P)^2D_{5/2}$	585.707	584.761	4.180[10]	$2s2p5d$	$(3P)^4P_{1/2}$	635.221	634.653	1.327[10]
$2s2p4p$	$(3P)^2S_{1/2}$	591.298	590.069	8.913[09]	$2s2p5d$	$(3P)^2F_{5/2}$	637.042	636.058	4.321[10]
$2s^27s$	$(1S)^2S_{1/2}$	585.346		1.249[09]	$2s2p5d$	$(3P)^2F_{7/2}$	637.237	636.233	6.688[10]
$2s^27d$	$(1S)^2D_{5/2}$	589.333		1.427[10]	$2s2p6d$	$(3P)^4D_{7/2}$	657.342	656.591	4.718[10]
$2s^27g$	$(1S)^2G_{7/2}$	589.981		3.288[09]	$2s2p4p$	$(1P)^2D_{3/2}$	659.970	656.745	6.034[10]
$2s^27g$	$(1S)^2G_{9/2}$	589.981		4.110[09]	$2s2p4p$	$(1P)^2D_{5/2}$	659.998	656.787	9.157[10]
$2s^27f$	$(1S)^2F_{5/2}$	590.231	587.850	9.208[09]	$2s2p6d$	$(3P)^2F_{5/2}$	658.432	657.471	3.299[10]
$2s^27f$	$(1S)^2F_{7/2}$	590.233	587.850	1.235[10]	$2s2p6d$	$(3P)^2F_{7/2}$	658.656	657.707	4.382[10]
$2s^27h$	$(1S)^2H_{9/2}$	590.073	588.529	2.694[09]	$2s2p4d$	$(1P)^2D_{3/2}$	668.193	668.557	6.945[10]
$2s^27h$	$(1S)^2H_{11/2}$	590.073	588.529	3.232[09]	$2s2p4d$	$(1P)^2D_{5/2}$	668.212	668.553	1.048[11]
$2s^27i$	$(1S)^2I_{11/2}$	590.090	588.546	2.278[09]	$2s2p7d$	$(3P)^4D_{3/2}$	670.618		1.399[10]
$2s^27i$	$(1S)^2I_{13/2}$	590.090	588.546	2.658[09]	$2s2p7d$	$(3P)^4D_{1/2}$	670.626		7.699[09]
$2s2p4d$	$(3P)^4D_{1/2}$	592.285	591.899	5.008[10]	$2s2p7d$	$(3P)^4D_{7/2}$	670.822	669.705	2.825[10]
$2s2p4d$	$(3P)^4D_{3/2}$	592.308	591.899	9.938[10]	$2p^24p$	$(3P)^4D_{1/2}$	712.882	713.033	1.027[10]
$2s2p4d$	$(3P)^4D_{5/2}$	592.354	591.962	1.477[11]	$2p^24p$	$(3P)^4D_{3/2}$	712.956	713.033	2.056[10]
$2s2p4d$	$(3P)^4D_{7/2}$	592.444	592.048	1.983[11]	$2p^24p$	$(3P)^4D_{5/2}$	713.086	713.033	3.089[10]

Table IV: Wavelengths ( $\lambda$  in  $\text{\AA}$ ), transition probabilities ( $A$  in  $\text{s}^{-1}$ ), and oscillator strengths ( $f$ ) in  $\text{O}^{3+}$ . Comparison of theoretical results (Cowan (a) and RMBPT (b) codes) with recommended NIST (c) data in Ref. 23.

Low level	Upper level	$\lambda^b$	$A^a$	$A^b$	$A^c$	$f^a$	$f^b$	$f^c$
$2s^2 2p(^2P_{1/2})$	$2s2p^2(^2S_{1/2})$	606.84	1.21[9]	1.14[9]	1.21[9]	7.12[-2]	6.28[-2]	6.70[-2]
$2s^2 2p(^2P_{3/2})$	$2s2p^2(^2S_{1/2})$	608.28	2.25[9]	2.16[9]	2.40[9]	6.62[-2]	5.99[-2]	6.69[-2]
$2s^2 2p(^2P_{1/2})$	$2s2p^2(^2P_{1/2})$	558.55	4.79[9]	3.97[9]	4.86[9]	2.32[-1]	1.86[-1]	2.24[-1]
$2s^2 2p(^2P_{1/2})$	$2s2p^2(^2P_{3/2})$	557.78	1.21[9]	1.00[9]	1.22[9]	1.17[-1]	9.35[-2]	1.12[-1]
$2s^2 2p(^2P_{3/2})$	$2s2p^2(^2P_{1/2})$	559.77	2.49[9]	2.03[9]	2.41[9]	6.05[-2]	4.78[-2]	5.58[-2]
$2s^2 2p(^2P_{3/2})$	$2s2p^2(^2P_{3/2})$	558.99	6.08[9]	5.01[9]	6.06[9]	2.95[-1]	2.35[-1]	2.79[-1]
$2s^2 2p(^2P_{1/2})$	$2s2p^2(^2D_{3/2})$	792.96	6.86[8]	5.66[8]	5.95[8]	1.28[-1]	1.07[-1]	1.11[-1]
$2s^2 2p(^2P_{3/2})$	$2s2p^2(^2D_{3/2})$	795.41	1.31[8]	1.10[8]	1.18[8]	1.24[-2]	1.04[-2]	1.10[-2]
$2s^2 2p(^2P_{3/2})$	$2s2p^2(^2D_{5/2})$	795.49	8.11[8]	6.70[8]	7.08[8]	1.14[-1]	9.53[-2]	9.94[-2]
$2s2p^2(^4P_{1/2})$	$2p^3(^4S_{3/2})$	626.15	1.15[9]	9.97[8]	1.07[9]	1.33[-1]	1.17[-1]	1.25[-1]
$2s2p^2(^4P_{3/2})$	$2p^3(^4S_{3/2})$	626.68	2.28[9]	1.99[9]	2.13[9]	1.33[-1]	1.17[-1]	1.25[-1]
$2s2p^2(^4P_{5/2})$	$2p^3(^4S_{3/2})$	627.44	3.41[9]	2.97[9]	3.19[9]	1.33[-1]	1.17[-1]	1.25[-1]
$2s2p^2(^2D_{3/2})$	$2p^3(^2D_{3/2})$	782.70	1.56[9]	1.34[9]	1.31[9]	1.33[-1]	1.23[-1]	1.19[-1]
$2s2p^2(^2D_{3/2})$	$2p^3(^2D_{5/2})$	782.85	1.20[8]	1.02[8]	9.70[7]	1.57[-2]	1.40[-2]	1.33[-2]
$2s2p^2(^2D_{5/2})$	$2p^3(^2D_{3/2})$	782.62	1.85[8]	1.54[8]	1.46[8]	1.02[-2]	9.44[-3]	8.85[-3]
$2s2p^2(^2D_{5/2})$	$2p^3(^2D_{5/2})$	782.77	1.63[9]	1.40[9]	1.36[9]	1.39[-1]	1.28[-1]	1.24[-1]
$2s2p^2(^2D_{3/2})$	$2p^3(^2P_{1/2})$	618.09	3.05[9]	2.63[9]	2.89[9]	8.64[-2]	7.55[-2]	8.25[-2]
$2s2p^2(^2D_{3/2})$	$2p^3(^2P_{3/2})$	618.04	3.13[8]	2.68[8]	2.89[8]	1.77[-2]	1.53[-2]	1.65[-2]
$2s2p^2(^2D_{5/2})$	$2p^3(^2P_{3/2})$	618.00	2.71[9]	2.35[9]	2.60[9]	1.03[-1]	9.91[-2]	8.99[-2]
$2s2p^2(^2S_{1/2})$	$2p^3(^2P_{1/2})$	812.27	4.78[8]	4.09[8]	4.05[8]	4.29[-2]	4.05[-2]	3.91[-2]
$2s2p^2(^2S_{1/2})$	$2p^3(^2P_{3/2})$	812.19	5.13[8]	4.29[8]	4.05[8]	9.20[-2]	8.50[-2]	7.82[-2]
$2s2p^2(^2P_{1/2})$	$2p^3(^2P_{1/2})$	918.57	1.11[9]	8.88[8]	8.83[8]	1.26[-1]	1.12[-1]	1.12[-1]
$2s2p^2(^2P_{1/2})$	$2p^3(^2P_{3/2})$	918.47	2.55[8]	2.11[8]	2.21[8]	5.84[-2]	5.34[-2]	5.62[-2]
$2s2p^2(^2P_{3/2})$	$2p^3(^2P_{1/2})$	920.67	5.34[8]	4.34[8]	4.39[8]	3.12[-2]	2.76[-2]	2.80[-2]
$2s2p^2(^2P_{3/2})$	$2p^3(^2P_{3/2})$	920.57	1.36[9]	1.10[9]	1.10[9]	1.59[-1]	1.40[-1]	1.40[-1]
$2s2p^2(^2P_{1/2})$	$2p^3(^2D_{3/2})$	1336.21	3.43[8]	2.27[8]	2.17[8]	1.47[-1]	1.21[-1]	1.17[-1]
$2s2p^2(^2P_{3/2})$	$2p^3(^2D_{3/2})$	1340.67	6.50[7]	4.36[7]	4.29[7]	1.40[-2]	1.18[-2]	1.16[-2]
$2s2p^2(^2P_{3/2})$	$2p^3(^2D_{5/2})$	1341.09	4.03[8]	2.67[8]	2.57[8]	1.31[-1]	1.08[-1]	1.04[-1]



Table V: Wavelengths ( $\lambda$ ) and weighted radiative transition probabilities ( $gA_r$ ) in  $s^{-1}$  for excited states of B-like O. Comparison of theoretical results (Cowan code) with recommended NIST data in Ref. 23.

Low level		Upper level		$\lambda$ (Å)		$gA_r$ ( $s^{-1}$ )	
Conf.	<i>LSJ</i>	Conf.	<i>LSJ</i>	Cowan	NIST	Cowan	NIST
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p4p$	$(^3P) ^2S_{1/2}$	169.12	169.472	2.20[09]	1.36[09]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p4p$	$(^3P) ^2S_{1/2}$	169.23	169.583	4.27[09]	2.72[09]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p4p$	$(^3P) ^2D_{3/2}$	170.80	171.074	1.49[10]	1.64[10]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p4p$	$(^3P) ^2D_{5/2}$	170.84	171.123	2.70[10]	2.95[10]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p4p$	$(^3P) ^2D_{3/2}$	170.91	171.187	3.14[09]	3.28[09]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p4p$	$(^3P) ^2P_{3/2}$	173.62	173.800	1.71[09]	3.05[09]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p4p$	$(^3P) ^2P_{1/2}$	173.68	173.852	5.10[09]	6.10[09]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p4p$	$(^3P) ^2P_{3/2}$	173.74	173.916	1.34[10]	1.52[10]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p4p$	$(^3P) ^2P_{1/2}$	173.80	173.969	2.46[09]	3.04[09]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s^2 3d$	$(^1S) ^2D_{3/2}$	238.65	238.360	1.21[11]	1.18[11]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s^2 3d$	$(^1S) ^2D_{5/2}$	238.86	238.570	2.17[11]	2.12[11]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s^2 3d$	$(^1S) ^2D_{3/2}$	238.87	238.579	2.41[10]	2.36[10]
$2s^2 2p$	$(^1D) ^2D_{5/2}$	$2s^2 3d$	$(^1S) ^2P_{3/2}$	379.73	379.778	2.68[09]	1.76[09]
$2s^2 2p$	$(^1D) ^2D_{3/2}$	$2s^2 3d$	$(^1S) ^2P_{3/2}$	379.73	379.798	2.97[08]	1.96[08]
$2s^2 2p$	$(^1D) ^2D_{3/2}$	$2s^2 3d$	$(^1S) ^2P_{1/2}$	379.85	379.923	1.49[09]	1.00[09]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p^2$	$(^1D) ^2D_{3/2}$	788.59	787.710	2.75[09]	2.38[09]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p^2$	$(^1D) ^2D_{3/2}$	790.98	790.112	5.27[08]	4.72[08]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p^2$	$(^1D) ^2D_{5/2}$	790.97	790.199	4.87[09]	4.25[09]
$2s2p^2$	$(^3P) ^4P_{1/2}$	$2s2p5d$	$(^3P) ^4P_{1/2}$	177.76	177.553	6.04[08]	1.78[09]
$2s2p^2$	$(^3P) ^4P_{1/2}$	$2s2p5d$	$(^3P) ^4P_{3/2}$	177.77	177.562	3.17[09]	8.88[09]
$2s2p^2$	$(^3P) ^4P_{3/2}$	$2s2p5d$	$(^3P) ^4P_{1/2}$	177.80	177.594	1.03[10]	8.88[09]
$2s2p^2$	$(^3P) ^4P_{3/2}$	$2s2p5d$	$(^3P) ^4P_{3/2}$	177.81	177.604	8.17[09]	2.84[09]
$2s2p^2$	$(^3P) ^4P_{3/2}$	$2s2p5d$	$(^3P) ^4P_{5/2}$	177.84	177.635	1.41[08]	9.60[09]
$2s2p^2$	$(^3P) ^4P_{5/2}$	$2s2p5d$	$(^3P) ^4P_{3/2}$	177.88	177.662	1.13[10]	9.60[09]
$2s2p^2$	$(^3P) ^4P_{5/2}$	$2s2p5d$	$(^3P) ^4P_{5/2}$	177.90	177.693	3.40[10]	2.24[10]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p4d$	$(^1P) ^2D_{3/2}$	184.71	184.631	6.50[08]	1.24[08]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p4d$	$(^1P) ^2D_{5/2}$	184.70	184.632	9.06[09]	1.73[09]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p4d$	$(^1P) ^2D_{3/2}$	184.71	184.636	6.46[09]	1.11[09]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p4d$	$(^1P) ^2D_{5/2}$	184.70	184.637	1.47[09]	1.24[08]
$2s2p^2$	$(^3P) ^2P_{1/2}$	$2s2p4d$	$(^1P) ^2D_{3/2}$	203.12	204.886	3.87[10]	3.43[10]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2s2p4d$	$(^1P) ^2D_{3/2}$	203.23	204.988	7.81[09]	6.84[09]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2s2p4d$	$(^1P) ^2D_{5/2}$	203.22	204.990	7.05[10]	6.18[10]
$2s2p3d$	$(^3P) ^4F_{3/2}$	$2s2p4f$	$(^3P) ^4G_{5/2}$	982.27	988.523	1.99[10]	2.11[10]
$2s2p3d$	$(^3P) ^4F_{5/2}$	$2s2p4f$	$(^3P) ^4G_{5/2}$	983.09	989.277	3.11[09]	3.39[09]
$2s2p3d$	$(^3P) ^4F_{5/2}$	$2s2p4f$	$(^3P) ^4G_{7/2}$	982.41	988.573	2.70[10]	2.82[10]
$2s2p3d$	$(^3P) ^4F_{7/2}$	$2s2p4f$	$(^3P) ^4G_{5/2}$	984.26	990.389	2.83[08]	1.22[08]
$2s2p3d$	$(^3P) ^4F_{7/2}$	$2s2p4f$	$(^3P) ^4G_{7/2}$	983.57	989.684	4.60[09]	4.44[09]
$2s2p3d$	$(^3P) ^4F_{7/2}$	$2s2p4f$	$(^3P) ^4G_{9/2}$	982.46	988.627	3.70[10]	3.76[10]
$2s2p3d$	$(^3P) ^4F_{9/2}$	$2s2p4f$	$(^3P) ^4G_{7/2}$	985.12	991.187	1.36[08]	9.92[07]
$2s2p3d$	$(^3P) ^4F_{9/2}$	$2s2p4f$	$(^3P) ^4G_{9/2}$	984.00	990.127	3.75[09]	3.38[09]
$2s2p3d$	$(^3P) ^4F_{9/2}$	$2s2p4f$	$(^3P) ^4G_{11/2}$	982.57	988.708	5.09[10]	4.92[10]

Table VI: High- $n$  contribution for DR rate coefficients ( $\alpha_d$  in  $\text{cm}^3/\text{s}$ ) for excited levels of B-like oxygen.

$T_e$ eV	$2s^22p$ ( $^1S$ )		$^4P_{1/2}$	$2s2p^2$ ( $^3P$ )	
	$^2P_{1/2}$	$^2P_{3/2}$		$^4P_{3/2}$	$^4P_{5/2}$
0.2856	5.00[-23]	1.00[-22]	9.00[-24]	4.00[-23]	9.00[-23]
0.3713	1.40[-20]	2.70[-20]	2.10[-21]	1.30[-20]	2.90[-20]
0.4827	1.07[-18]	2.00[-18]	1.28[-19]	1.02[-18]	2.30[-18]
0.6275	2.76[-17]	5.20[-17]	2.92[-18]	2.77[-17]	6.40[-17]
0.8157	3.21[-16]	6.14[-16]	3.13[-17]	3.36[-16]	7.96[-16]
1.0604	2.01[-15]	3.88[-15]	1.83[-16]	2.17[-15]	5.22[-15]
1.3786	7.73[-15]	1.50[-14]	6.73[-16]	8.57[-15]	2.09[-14]
1.7922	2.03[-14]	3.96[-14]	1.71[-15]	2.29[-14]	5.62[-14]
2.3298	3.94[-14]	7.73[-14]	3.23[-15]	4.52[-14]	1.11[-13]
3.0287	6.05[-14]	1.19[-13]	4.85[-15]	7.00[-14]	1.74[-13]
3.9374	7.75[-14]	1.53[-13]	6.08[-15]	9.01[-14]	2.24[-13]
5.1186	8.61[-14]	1.71[-13]	6.63[-15]	1.00[-13]	2.50[-13]
6.6542	8.57[-14]	1.70[-13]	6.49[-15]	9.93[-14]	2.48[-13]
8.6504	7.83[-14]	1.56[-13]	5.84[-15]	9.02[-14]	2.26[-13]
11.2455	6.69[-14]	1.33[-13]	4.91[-15]	7.65[-14]	1.92[-13]
14.6192	5.43[-14]	1.08[-13]	3.93[-15]	6.16[-14]	1.55[-13]
19.0049	4.22[-14]	8.42[-14]	3.02[-15]	4.77[-14]	1.20[-13]
24.7064	3.18[-14]	6.34[-14]	2.26[-15]	3.57[-14]	8.97[-14]
32.1184	2.34[-14]	4.67[-14]	1.65[-15]	2.61[-14]	6.56[-14]
41.7539	1.69[-14]	3.37[-14]	1.18[-15]	1.88[-14]	4.72[-14]
54.2800	1.20[-14]	2.39[-14]	8.34[-16]	1.33[-14]	3.34[-14]
70.5640	8.42[-15]	1.68[-14]	5.83[-16]	9.29[-15]	2.34[-14]
91.7332	5.86[-15]	1.17[-14]	4.04[-16]	6.45[-15]	1.62[-14]
119.2532	4.05[-15]	8.07[-15]	2.78[-16]	4.45[-15]	1.12[-14]
$T_e$ eV	$2s2p^2$ ( $^2D$ )		$2s2p^2$ ( $^1S$ )	$2s2p^2$ ( $^3P$ )	
	$^2D_{3/2}$	$^2D_{5/2}$	$^2S_{1/2}$	$^2P_{1/2}$	$^2P_{3/2}$
0.2856	7.00[-23]	1.20[-22]	5.00[-23]	3.00[-23]	8.00[-23]
0.3713	2.30[-20]	3.80[-20]	1.60[-20]	8.00[-21]	2.40[-20]
0.4827	1.80[-18]	3.20[-18]	1.21[-18]	5.80[-19]	1.90[-18]
0.6275	5.30[-17]	9.30[-17]	3.33[-17]	1.60[-17]	5.50[-17]
0.8157	6.67[-16]	1.19[-15]	4.10[-16]	1.98[-16]	6.89[-16]
1.0604	4.46[-15]	8.03[-15]	2.69[-15]	1.30[-15]	4.58[-15]
1.3786	1.80[-14]	3.28[-14]	1.08[-14]	5.16[-15]	1.84[-14]
1.7922	4.92[-14]	9.00[-14]	2.93[-14]	1.39[-14]	5.01[-14]
2.3298	9.86[-14]	1.81[-13]	5.85[-14]	2.77[-14]	1.00[-13]
3.0287	1.56[-13]	2.87[-13]	9.20[-14]	4.36[-14]	1.57[-13]
3.9374	2.03[-13]	3.75[-13]	1.20[-13]	5.69[-14]	2.05[-13]
5.1186	2.30[-13]	4.25[-13]	1.37[-13]	6.45[-14]	2.31[-13]
6.6542	2.33[-13]	4.29[-13]	1.39[-13]	6.55[-14]	2.33[-13]
8.6504	2.16[-13]	3.97[-13]	1.29[-13]	6.11[-14]	2.15[-13]
11.2455	1.87[-13]	3.43[-13]	1.12[-13]	5.31[-14]	1.86[-13]
14.6192	1.53[-13]	2.80[-13]	9.19[-14]	4.38[-14]	1.52[-13]
19.0049	1.20[-13]	2.20[-13]	7.23[-14]	3.45[-14]	1.19[-13]
24.7064	9.12[-14]	1.66[-13]	5.51[-14]	2.63[-14]	9.00[-14]
32.1184	6.75[-14]	1.23[-13]	4.08[-14]	1.95[-14]	6.64[-14]
41.7539	4.88[-14]	8.89[-14]	2.96[-14]	1.42[-14]	4.80[-14]
54.2800	3.48[-14]	6.33[-14]	2.11[-14]	1.02[-14]	3.42[-14]
70.5640	2.45[-14]	4.45[-14]	1.49[-14]	7.16[-15]	2.41[-14]
91.7332	1.71[-14]	3.10[-14]	1.04[-14]	5.00[-15]	1.68[-14]
119.2532	1.18[-14]	2.15[-14]	7.20[-15]	3.46[-15]	1.16[-14]

Table VII: Total DR rate coefficients ( $\alpha_d^{\text{tot}}$  in  $\text{cm}^3/\text{s}$ ):  $\alpha_d^{\text{tot}} = \alpha_d^a + \alpha_d^b + \alpha_d^c$  as function of electron temperature ( $T_e$  in eV) for B-like oxygen. Contributions of  $\alpha_d^a$  and  $\alpha_d^c$  are sum from excited states with  $n=2-8$  and  $n=9-30000$ , respectively. Contribution of  $\alpha_d^b$  is from scaling of the  $2s^2nl - 2s2pnl$  transitions from  $n=9$  up to  $n = 30000$ .

$T_e$	$\alpha_d^a$	$\alpha_d^b$	$\alpha_d^c$	$\alpha_d^{\text{total}}$
0.1000	3.06[-11]	1.00[-83]	0.00[00]	3.06[-11]
0.1300	3.63[-11]	8.00[-67]	0.00[00]	3.63[-11]
0.1690	4.16[-11]	6.90[-54]	0.00[00]	4.16[-11]
0.2197	4.61[-11]	3.00[-28]	1.00[-24]	4.61[-11]
0.2856	4.98[-11]	1.10[-24]	7.00[-22]	4.98[-11]
0.3713	5.28[-11]	3.52[-22]	1.90[-19]	5.28[-11]
0.4827	5.48[-11]	3.10[-20]	1.52[-17]	5.48[-11]
0.6275	5.53[-11]	1.10[-18]	4.25[-16]	5.53[-11]
0.8157	5.44[-11]	1.89[-17]	5.25[-15]	5.44[-11]
1.0604	5.24[-11]	2.34[-16]	3.45[-14]	5.25[-11]
1.3786	4.97[-11]	3.87[-15]	1.38[-13]	4.98[-11]
1.7922	4.63[-11]	5.28[-14]	3.73[-13]	4.67[-11]
2.3298	4.23[-11]	4.05[-13]	7.42[-13]	4.34[-11]
3.0287	3.75[-11]	1.82[-12]	1.16[-12]	4.05[-11]
3.9374	3.24[-11]	5.29[-12]	1.51[-12]	3.92[-11]
5.1186	2.73[-11]	1.10[-11]	1.70[-12]	4.00[-11]
6.6542	2.23[-11]	1.78[-11]	1.71[-12]	4.18[-11]
8.6504	1.78[-11]	2.34[-11]	1.57[-12]	4.27[-11]
11.2455	1.38[-11]	2.64[-11]	1.35[-12]	4.16[-11]
14.6192	1.04[-11]	2.65[-11]	1.10[-12]	3.80[-11]
19.0049	7.75[-12]	2.43[-11]	8.62[-13]	3.29[-11]
24.7064	5.65[-12]	2.07[-11]	6.52[-13]	2.70[-11]
32.1184	4.05[-12]	1.67[-11]	4.81[-13]	2.12[-11]
41.7539	2.87[-12]	1.30[-11]	3.47[-13]	1.62[-11]
54.2800	2.01[-12]	9.73[-12]	2.47[-13]	1.20[-11]
70.5640	1.40[-12]	7.12[-12]	1.74[-13]	8.70[-12]
91.7332	9.65[-13]	5.12[-12]	1.21[-13]	6.21[-12]
119.2532	6.63[-13]	3.63[-12]	8.36[-14]	4.37[-12]
155.0291	4.54[-13]	2.54[-12]	5.75[-14]	3.05[-12]
201.5378	3.10[-13]	1.76[-12]	3.94[-14]	2.11[-12]
261.9991	2.11[-13]	1.22[-12]	2.68[-14]	1.45[-12]
340.5989	1.43[-13]	8.35[-13]	1.83[-14]	9.96[-13]
442.7785	9.69[-14]	5.71[-13]	1.24[-14]	6.80[-13]
575.6121	6.57[-14]	3.89[-13]	8.41[-15]	4.63[-13]
748.2956	4.44[-14]	2.64[-13]	5.70[-15]	3.15[-13]
972.7843	3.00[-14]	1.79[-13]	3.86[-15]	2.13[-13]
1264.6195	2.03[-14]	1.22[-13]	2.61[-15]	1.45[-13]

Table VIII: Autoionization rates ( $A_a$  in  $s^{-1}$ ) and excitation energies ( $E_S$  in eV) for even-parity states. Wavelengths ( $\lambda$  in  $\text{\AA}$ ), weighted radiative rates ( $gA_r$  in  $s^{-1}$ ), factor intensities ( $Q_d$  in  $s^{-1}$ ) and effective emission rate coefficients ( $C_S^{\text{eff}}$  in  $\text{cm}^3/s$ ) for transitions between odd- and even-parity states of B-like oxygen.

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{\text{eff}}$
Conf.	LSJ	Conf.	LSJ	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	$\text{\AA}$	$s^{-1}$	$\text{cm}^3/s$
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p8p$	$(^1P) ^2S_{1/2}$	8.05[13]	1.28[14]	16.087	2.17[10]	2.55[09]	132.60	1.60[09]	1.68[-15]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p8p$	$(^1P) ^2S_{1/2}$	8.05[13]	1.28[14]	16.087	2.17[10]	5.12[09]	132.67	3.22[09]	3.37[-15]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p8p$	$(^1P) ^2D_{3/2}$	4.11[12]	1.31[13]	16.040	1.68[10]	1.29[09]	132.67	4.06[08]	4.27[-16]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p8p$	$(^1P) ^2D_{5/2}$	4.11[12]	1.30[13]	16.040	2.52[10]	2.33[09]	132.74	7.40[08]	7.78[-16]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p7p$	$(^1P) ^2S_{1/2}$	8.21[13]	1.14[14]	14.897	1.15[10]	1.53[09]	134.31	1.10[09]	1.30[-15]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p7p$	$(^1P) ^2S_{1/2}$	8.21[13]	1.14[14]	14.897	1.15[10]	1.53[09]	134.31	1.10[09]	1.30[-15]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p7p$	$(^1P) ^2D_{3/2}$	4.46[12]	1.59[13]	14.869	1.43[10]	8.09[08]	134.35	2.26[08]	2.67[-16]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p7p$	$(^1P) ^2D_{5/2}$	4.48[12]	1.60[13]	14.869	2.14[10]	1.50[09]	134.42	4.20[08]	4.97[-16]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p6p$	$(^1P) ^2S_{1/2}$	1.35[14]	2.00[14]	13.152	1.18[10]	1.45[09]	136.90	9.81[08]	1.38[-15]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p6p$	$(^1P) ^2S_{1/2}$	1.35[14]	2.00[14]	13.152	1.18[10]	2.81[09]	136.97	1.90[09]	2.66[-15]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p5p$	$(^1P) ^2S_{1/2}$	2.11[14]	2.11[14]	10.210	1.19[10]	1.33[09]	141.50	1.32[09]	2.50[-15]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p5p$	$(^1P) ^2S_{1/2}$	2.11[14]	2.11[14]	10.210	1.19[10]	2.69[09]	141.57	2.69[09]	5.07[-15]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p5p$	$(^1P) ^2D_{3/2}$	2.04[12]	2.04[12]	10.077	1.96[10]	1.04[09]	141.71	1.03[09]	1.97[-15]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p5p$	$(^1P) ^2D_{5/2}$	2.06[12]	2.06[12]	10.077	2.93[10]	1.92[09]	141.79	1.91[09]	3.66[-15]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p5p$	$(^1P) ^2D_{3/2}$	2.04[12]	2.04[12]	10.077	1.96[10]	2.20[08]	141.79	2.19[08]	4.19[-16]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2p^2 3d$	$(^1S) ^2D_{3/2}$	8.55[11]	8.55[11]	9.610	6.72[10]	8.89[08]	142.47	8.72[08]	1.75[-15]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2p^2 3d$	$(^1S) ^2D_{5/2}$	8.59[11]	8.59[11]	9.608	1.00[11]	1.62[09]	142.55	1.58[09]	3.17[-15]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2p^2 3d$	$(^1S) ^2D_{3/2}$	8.55[11]	8.55[11]	9.610	6.72[10]	1.81[08]	142.55	1.77[08]	3.54[-16]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p8f$	$(^3P) ^2D_{3/2}$	2.84[11]	2.84[11]	6.919	5.78[09]	9.45[08]	147.02	9.40[08]	2.46[-15]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p8f$	$(^3P) ^2D_{3/2}$	2.84[11]	2.84[11]	6.919	5.78[09]	1.93[08]	147.10	1.92[08]	5.04[-16]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p8f$	$(^3P) ^2D_{5/2}$	1.70[11]	1.70[11]	6.912	8.19[09]	1.07[09]	147.11	1.07[09]	2.79[-15]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p8f$	$(^3P) ^4D_{5/2}$	1.85[10]	1.85[10]	6.903	4.20[09]	1.21[08]	147.13	1.16[08]	3.05[-16]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p8f$	$(^3P) ^2F_{5/2}$	9.54[10]	9.54[10]	6.871	7.51[09]	6.58[08]	147.19	6.49[08]	1.71[-15]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p8p$	$(^3P) ^2D_{3/2}$	6.01[11]	6.01[11]	6.741	4.88[09]	8.83[08]	147.33	8.81[08]	2.35[-15]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p8p$	$(^3P) ^2D_{5/2}$	6.40[11]	6.40[11]	6.769	6.52[09]	2.46[09]	147.36	2.46[09]	6.54[-15]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p8p$	$(^3P) ^2D_{3/2}$	6.01[11]	6.01[11]	6.741	4.88[09]	9.90[08]	147.41	9.88[08]	2.63[-15]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p8p$	$(^3P) ^2P_{3/2}$	1.28[10]	1.28[10]	6.690	5.99[09]	7.55[08]	147.42	6.75[08]	1.81[-15]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p8p$	$(^3P) ^2P_{1/2}$	9.54[10]	9.54[10]	6.665	4.96[09]	1.20[09]	147.46	1.16[09]	3.13[-15]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p8p$	$(^3P) ^2P_{3/2}$	1.28[10]	1.28[10]	6.666	5.99[09]	5.42[08]	147.46	4.85[08]	1.30[-15]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p8p$	$(^3P) ^2P_{3/2}$	1.28[10]	1.28[10]	6.690	5.99[09]	1.42[09]	147.50	1.27[09]	3.42[-15]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p8p$	$(^3P) ^4D_{1/2}$	2.54[10]	2.54[10]	6.639	1.40[09]	2.15[08]	147.51	2.10[08]	5.65[-16]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p8p$	$(^3P) ^2P_{3/2}$	1.28[10]	1.28[10]	6.666	5.99[09]	1.42[09]	147.54	1.27[09]	3.40[-15]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p8p$	$(^3P) ^2P_{1/2}$	9.54[10]	9.54[10]	6.665	4.96[09]	6.04[08]	147.54	5.88[08]	1.58[-15]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p8p$	$(^3P) ^4D_{1/2}$	2.54[10]	2.54[10]	6.639	1.40[09]	1.10[08]	147.59	1.07[08]	2.88[-16]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p7f$	$(^3P) ^2D_{3/2}$	3.44[11]	3.44[11]	5.888	5.80[09]	2.53[08]	148.84	2.52[08]	7.32[-16]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p7f$	$(^3P) ^2D_{5/2}$	2.65[11]	2.65[11]	5.875	1.04[10]	3.78[08]	148.95	3.76[08]	1.09[-15]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2p^2 3d$	$(^1D) ^2S_{1/2}$	1.03[14]	1.03[14]	5.805	9.73[09]	3.60[08]	149.07	3.60[08]	1.05[-15]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p7p$	$(^3P) ^2S_{1/2}$	3.80[12]	3.80[12]	5.751	1.70[10]	2.24[08]	149.08	2.24[08]	6.59[-16]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p7p$	$(^3P) ^2S_{1/2}$	3.80[12]	3.80[12]	5.751	1.70[10]	9.02[08]	149.17	9.00[08]	2.65[-15]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p7p$	$(^3P) ^2D_{3/2}$	8.67[11]	8.67[11]	5.630	1.23[10]	4.76[09]	149.30	4.74[09]	1.41[-14]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p7p$	$(^3P) ^2D_{5/2}$	8.74[11]	8.74[11]	5.659	1.81[10]	1.08[10]	149.33	1.08[10]	3.21[-14]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p7p$	$(^3P) ^2D_{3/2}$	8.67[11]	8.67[11]	5.630	1.23[10]	2.69[09]	149.39	2.68[09]	7.98[-15]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p7p$	$(^3P) ^2P_{3/2}$	2.60[10]	2.60[10]	5.552	1.36[10]	2.63[09]	149.44	2.32[09]	6.98[-15]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p7p$	$(^3P) ^2P_{1/2}$	5.62[10]	5.62[10]	5.530	8.55[09]	4.01[09]	149.48	3.73[09]	1.12[-14]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p7p$	$(^3P) ^4S_{3/2}$	4.98[09]	4.98[09]	5.525	5.31[09]	7.62[08]	149.49	6.02[08]	1.81[-15]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p7p$	$(^3P) ^2P_{3/2}$	2.60[10]	2.60[10]	5.552	1.36[10]	6.35[09]	149.53	5.61[09]	1.69[-14]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p7p$	$(^3P) ^4D_{1/2}$	4.69[09]	4.69[09]	5.485	8.79[08]	1.99[08]	149.56	1.82[08]	5.51[-16]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p7p$	$(^3P) ^4S_{3/2}$	4.98[09]	4.98[09]	5.525	5.31[09]	2.16[09]	149.57	1.71[09]	5.14[-15]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p7p$	$(^3P) ^2P_{1/2}$	5.62[10]	5.62[10]	5.530	8.55[09]	1.73[09]	149.57	1.61[09]	4.84[-15]
$2s^2 2p$	$(^1S) ^2P_{3/2}$	$2s2p7p$	$(^3P) ^4D_{3/2}$	3.04[09]	3.04[09]	5.494	1.11[09]	1.18[08]	149.63	1.08[08]	3.25[-16]
$2s^2 2p$	$(^1S) ^2P_{1/2}$	$2s2p4p$	$(^1P) ^2D_{3/2}$	3.20[11]	3.20[11]	4.412	6.03[10]	2.91[08]	151.52	2.78[08]	9.36[-16]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{\text{eff}}$
Conf.	$LSJ$	Conf.	$LSJ$	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	$\text{\AA}$	$s^{-1}$	$\text{cm}^3/\text{s}$
$2s^22p$	$(^1S) ^2P_{3/2}$	$2s2p4p$	$(^1P) ^2D_{5/2}$	3.58[11]	3.58[11]	4.416	9.16[10]	4.87[08]	151.60	4.67[08]	1.57[-15]
$2s^22p$	$(^1S) ^2P_{1/2}$	$2s2p4p$	$(^1P) ^2S_{1/2}$	1.54[14]	1.54[14]	4.325	9.31[09]	2.83[08]	151.68	2.83[08]	9.60[-16]
$2s^22p$	$(^1S) ^2P_{1/2}$	$2s2p6f$	$(^3P) ^2D_{3/2}$	6.82[11]	6.82[11]	4.328	1.43[10]	2.88[08]	151.68	2.87[08]	9.73[-16]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2s2p4p$	$(^1P) ^2S_{1/2}$	1.54[14]	1.54[14]	4.325	9.31[09]	3.33[08]	151.77	3.33[08]	1.13[-15]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2s2p6f$	$(^3P) ^2D_{5/2}$	3.02[11]	3.02[11]	4.328	3.70[10]	2.78[08]	151.77	2.72[08]	9.25[-16]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2s2p6f$	$(^3P) ^2D_{5/2}$	3.02[11]	3.02[11]	4.291	3.70[10]	2.00[08]	151.83	1.96[08]	6.69[-16]
$2s^22p$	$(^1S) ^2P_{1/2}$	$2s2p4p$	$(^1P) ^2P_{1/2}$	2.13[11]	2.13[11]	4.134	3.11[10]	4.26[09]	152.04	3.97[09]	1.37[-14]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2s2p4p$	$(^1P) ^2P_{3/2}$	5.81[08]	5.81[08]	4.141	6.20[10]	1.15[10]	152.11	4.16[08]	1.44[-15]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2s2p4p$	$(^1P) ^2P_{1/2}$	2.13[11]	2.13[11]	4.134	3.11[10]	2.46[09]	152.13	2.29[09]	7.94[-15]
$2s^22p$	$(^1S) ^2P_{1/2}$	$2s2p6p$	$(^3P) ^2S_{1/2}$	3.79[13]	3.79[13]	3.929	1.91[10]	2.63[09]	152.42	2.63[09]	9.30[-15]
$2s^22p$	$(^1S) ^2P_{1/2}$	$2s2p6p$	$(^3P) ^2D_{3/2}$	3.65[11]	3.65[11]	3.930	5.04[10]	2.33[09]	152.42	2.25[09]	7.95[-15]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2s2p6p$	$(^3P) ^2D_{5/2}$	3.69[11]	3.69[11]	3.956	7.14[10]	4.88[09]	152.46	4.72[09]	1.66[-14]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2s2p6p$	$(^3P) ^2S_{1/2}$	3.79[13]	3.79[13]	3.929	1.91[10]	5.48[09]	152.51	5.47[09]	1.93[-14]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2s2p6p$	$(^3P) ^2D_{3/2}$	3.65[11]	3.65[11]	3.930	5.04[10]	5.19[08]	152.51	5.02[08]	1.77[-15]
$2s^22p$	$(^1S) ^2P_{1/2}$	$2s2p6p$	$(^3P) ^2P_{3/2}$	1.92[11]	1.92[11]	3.697	3.09[10]	7.54[08]	152.86	7.25[08]	2.62[-15]
$2s^22p$	$(^1S) ^2P_{1/2}$	$2s2p6p$	$(^3P) ^4D_{1/2}$	2.43[09]	2.43[09]	3.684	2.96[09]	8.56[08]	152.88	5.32[08]	1.93[-15]
$2s^22p$	$(^1S) ^2P_{1/2}$	$2p^23d$	$(^1D) ^2D_{3/2}$	5.47[11]	5.47[11]	3.679	5.46[10]	8.44[09]	152.89	8.24[09]	2.98[-14]
$2s^22p$	$(^1S) ^2P_{1/2}$	$2s2p6p$	$(^3P) ^2P_{1/2}$	2.18[09]	2.18[09]	3.665	3.61[09]	1.17[09]	152.92	6.37[08]	2.31[-15]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2s2p6p$	$(^3P) ^4D_{5/2}$	1.96[11]	1.96[11]	3.703	3.86[10]	3.88[09]	152.94	3.76[09]	1.36[-14]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2s2p6p$	$(^3P) ^2P_{3/2}$	1.92[11]	1.92[11]	3.697	3.09[10]	4.28[09]	152.95	4.11[09]	1.49[-14]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2p^23d$	$(^1D) ^2D_{5/2}$	5.44[11]	5.44[11]	3.691	8.43[10]	1.06[10]	152.96	1.03[10]	3.72[-14]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2s2p6p$	$(^3P) ^4D_{1/2}$	2.43[09]	2.43[09]	3.684	2.96[09]	3.09[08]	152.97	1.92[08]	6.94[-16]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2s2p6p$	$(^3P) ^4D_{3/2}$	7.29[09]	7.29[09]	3.680	4.88[09]	1.42[09]	152.98	1.22[09]	4.42[-15]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2s2p6p$	$(^3P) ^2P_{1/2}$	2.18[09]	2.18[09]	3.665	3.61[09]	4.21[08]	153.01	2.30[08]	8.35[-16]
$2s^22p$	$(^1S) ^2P_{1/2}$	$2p^23d$	$(^3P) ^2D_{3/2}$	6.22[11]	6.22[11]	2.758	1.09[11]	1.27[09]	154.65	1.22[09]	4.84[-15]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2p^23d$	$(^3P) ^2D_{5/2}$	6.10[11]	6.10[11]	2.761	1.66[11]	2.11[09]	154.73	2.01[09]	8.00[-15]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2p^23d$	$(^3P) ^2D_{3/2}$	6.22[11]	6.22[11]	2.758	1.09[11]	2.42[08]	154.74	2.32[08]	9.21[-16]
$2s^22p$	$(^1S) ^2P_{1/2}$	$2s2p5f$	$(^3P) ^2D_{3/2}$	9.64[11]	9.64[11]	1.400	2.27[10]	1.38[08]	157.31	1.37[08]	6.24[-16]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2s2p5f$	$(^3P) ^2D_{5/2}$	8.59[11]	8.59[11]	1.385	3.33[10]	3.92[08]	157.44	3.89[08]	1.77[-15]
$2s^22p$	$(^1S) ^2P_{1/2}$	$2s2p5p$	$(^3P) ^2S_{1/2}$	1.06[13]	1.06[13]	1.069	1.06[10]	1.31[09]	157.98	1.31[09]	6.16[-15]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2s2p5p$	$(^3P) ^2S_{1/2}$	1.06[13]	1.06[13]	1.069	1.06[10]	3.48[09]	158.07	3.48[09]	1.64[-14]
$2s^22p$	$(^1S) ^2P_{1/2}$	$2s2p5p$	$(^3P) ^2D_{3/2}$	4.45[12]	4.45[12]	0.926	2.01[10]	1.01[10]	158.27	1.00[10]	4.79[-14]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2s2p5p$	$(^3P) ^2D_{5/2}$	4.70[12]	4.70[12]	0.953	2.90[10]	2.14[10]	158.31	2.13[10]	1.02[-13]
$2s^22p$	$(^1S) ^2P_{1/2}$	$2p^23d$	$(^3P) ^2P_{1/2}$	4.53[10]	4.53[10]	0.892	2.57[10]	1.31[09]	158.33	1.02[09]	4.87[-15]
$2s^22p$	$(^1S) ^2P_{1/2}$	$2p^23d$	$(^3P) ^2P_{3/2}$	4.76[09]	4.76[09]	0.885	4.66[10]	2.41[09]	158.35	6.98[08]	3.35[-15]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2s2p5p$	$(^3P) ^2D_{3/2}$	4.45[12]	4.45[12]	0.926	2.01[10]	3.96[09]	158.36	3.96[09]	1.89[-14]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2p^23d$	$(^3P) ^2P_{1/2}$	4.53[10]	4.53[10]	0.892	2.57[10]	3.99[08]	158.43	3.11[08]	1.49[-15]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2p^23d$	$(^3P) ^2P_{3/2}$	4.76[09]	4.76[09]	0.885	4.66[10]	2.26[09]	158.44	6.57[08]	3.15[-15]
$2s^22p$	$(^1S) ^2P_{1/2}$	$2s2p5p$	$(^3P) ^2P_{1/2}$	4.91[09]	4.91[09]	0.522	2.16[10]	4.35[09]	159.09	1.36[09]	6.74[-15]
$2s^22p$	$(^1S) ^2P_{1/2}$	$2p^23d$	$(^3P) ^2P_{3/2}$	4.76[09]	4.76[09]	0.517	4.66[10]	2.28[09]	159.10	6.62[08]	3.29[-15]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2s2p5p$	$(^3P) ^2P_{1/2}$	4.91[09]	4.91[09]	0.522	2.16[10]	1.98[09]	159.18	6.17[08]	3.07[-15]
$2s^22p$	$(^1S) ^2P_{3/2}$	$2p^23d$	$(^3P) ^2P_{3/2}$	4.76[09]	4.76[09]	0.517	4.66[10]	9.50[09]	159.19	2.76[09]	1.37[-14]
$2p^3$	$(^2P) ^2P_{3/2}$	$2p^25d$	$(^1D) ^2S_{1/2}$	3.23[12]	1.26[14]	20.594	1.44[10]	7.11[09]	199.59	1.82[08]	1.22[-16]
$2p^3$	$(^2D) ^2D_{3/2}$	$2s2p8p$	$(^1P) ^2D_{3/2}$	4.11[12]	1.31[13]	16.040	1.68[10]	1.39[09]	202.30	4.38[08]	4.61[-16]
$2p^3$	$(^2D) ^2D_{5/2}$	$2s2p8p$	$(^1P) ^2D_{5/2}$	4.11[12]	1.30[13]	16.040	2.52[10]	2.15[09]	202.30	6.81[08]	7.17[-16]
$2p^3$	$(^2D) ^2D_{5/2}$	$2s2p7f$	$(^1P) ^2D_{5/2}$	3.63[10]	2.43[12]	15.190	3.93[10]	8.53[09]	205.14	1.27[08]	1.46[-16]
$2p^3$	$(^2D) ^2D_{3/2}$	$2s2p7p$	$(^1P) ^2D_{3/2}$	4.46[12]	1.59[13]	14.869	1.43[10]	9.00[08]	206.24	2.51[08]	2.97[-16]
$2p^3$	$(^2D) ^2D_{5/2}$	$2s2p7p$	$(^1P) ^2D_{5/2}$	4.48[12]	1.60[13]	14.869	2.14[10]	1.38[09]	206.24	3.87[08]	4.58[-16]
$2p^3$	$(^2P) ^2P_{3/2}$	$2p^25d$	$(^3P) ^2D_{5/2}$	4.09[11]	1.52[14]	17.947	8.07[10]	4.07[10]	208.47	1.09[08]	9.50[-17]
$2p^3$	$(^2D) ^2D_{5/2}$	$2p^24d$	$(^3P) ^2D_{5/2}$	2.78[12]	1.87[14]	13.209	8.29[10]	1.06[10]	212.09	1.58[08]	2.21[-16]
$2p^3$	$(^2D) ^2D_{3/2}$	$2s2p6p$	$(^1P) ^2D_{3/2}$	1.70[12]	8.81[13]	13.101	4.28[10]	7.22[09]	212.48	1.40[08]	1.97[-16]
$2p^3$	$(^2D) ^2D_{5/2}$	$2s2p6p$	$(^1P) ^2D_{5/2}$	1.86[12]	8.06[13]	13.103	6.10[10]	1.12[10]	212.48	2.59[08]	3.66[-16]
$2p^3$	$(^4S) ^4S_{3/2}$	$2p^24s$	$(^3P) ^4P_{5/2}$	8.85[07]	8.85[07]	9.779	3.28[10]	8.25[09]	212.85	1.31[08]	2.59[-16]

Low level		Upper level		A <sub>a</sub>	ΣA <sub>a</sub>	E <sub>S</sub>	ΣgA <sub>r</sub>	gA <sub>r</sub>	λ	Q <sub>d</sub>	C <sub>S</sub> <sup>eff</sup>
Conf.	LSJ	Conf.	LSJ	s <sup>-1</sup>	s <sup>-1</sup>	eV	s <sup>-1</sup>	s <sup>-1</sup>	Å	s <sup>-1</sup>	cm <sup>3</sup> /s
2p <sup>3</sup>	( <sup>4</sup> S) <sup>4</sup> S <sub>3/2</sub>	2p <sup>2</sup> 4s	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2.01[09]	2.01[09]	9.730	1.09[10]	2.70[09]	213.03	7.29[08]	1.44[-15]
2p <sup>3</sup>	( <sup>2</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p8p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	8.05[13]	1.28[14]	16.087	2.17[10]	1.95[09]	215.20	1.22[09]	1.28[-15]
2p <sup>3</sup>	( <sup>2</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p8p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	8.05[13]	1.28[14]	16.087	2.17[10]	3.94[09]	215.20	2.48[09]	2.60[-15]
2p <sup>3</sup>	( <sup>2</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p8p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	4.11[12]	1.30[13]	16.040	2.52[10]	3.23[08]	215.38	1.02[08]	1.08[-16]
2p <sup>3</sup>	( <sup>2</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 4d	( <sup>1</sup> D) <sup>2</sup> S <sub>1/2</sub>	5.88[12]	8.18[13]	15.634	2.50[10]	5.87[09]	216.90	4.21[08]	4.62[-16]
2p <sup>3</sup>	( <sup>2</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 4d	( <sup>1</sup> D) <sup>2</sup> S <sub>1/2</sub>	5.88[12]	8.18[13]	15.634	2.50[10]	1.41[10]	216.91	1.01[09]	1.11[-15]
2p <sup>3</sup>	( <sup>2</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7f	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.63[10]	2.43[12]	15.190	3.93[10]	7.67[09]	218.60	1.14[08]	1.31[-16]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p5p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2.04[12]	2.04[12]	10.077	1.96[10]	2.28[08]	224.10	2.27[08]	4.34[-16]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p5p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2.06[12]	2.06[12]	10.077	2.93[10]	3.60[08]	224.10	3.59[08]	6.85[-16]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p5p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.62[08]	4.62[08]	9.875	1.08[10]	1.94[09]	224.92	1.53[08]	2.99[-16]
2p <sup>3</sup>	( <sup>2</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 4d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2.78[12]	1.87[14]	13.209	8.29[10]	4.68[10]	226.52	6.95[08]	9.71[-16]
2p <sup>3</sup>	( <sup>2</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 4d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2.93[12]	1.79[14]	13.201	5.32[10]	2.48[10]	226.54	4.05[08]	5.66[-16]
2p <sup>3</sup>	( <sup>2</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	1.35[14]	2.00[14]	13.152	1.18[10]	1.93[08]	226.75	1.30[08]	1.83[-16]
2p <sup>3</sup>	( <sup>2</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p6p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	1.70[12]	8.81[13]	13.101	4.28[10]	1.62[10]	226.96	3.14[08]	4.43[-16]
2p <sup>3</sup>	( <sup>2</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	1.86[12]	8.06[13]	13.103	6.10[10]	2.69[10]	226.96	6.20[08]	8.76[-16]
2p <sup>3</sup>	( <sup>4</sup> S) <sup>4</sup> S <sub>3/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	6.20[09]	6.20[09]	5.593	1.26[09]	1.20[08]	229.34	1.16[08]	3.48[-16]
2p <sup>3</sup>	( <sup>4</sup> S) <sup>4</sup> S <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2.10[08]	2.10[08]	3.825	2.84[09]	7.08[08]	237.09	2.18[08]	7.78[-16]
2p <sup>3</sup>	( <sup>4</sup> S) <sup>4</sup> S <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	4.21[10]	4.21[10]	3.798	9.50[08]	2.47[08]	237.21	2.45[08]	8.75[-16]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2.84[11]	2.84[11]	6.919	5.78[09]	4.00[08]	237.66	3.98[08]	1.04[-15]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	1.70[11]	1.70[11]	6.912	8.19[09]	7.45[08]	237.70	7.39[08]	1.94[-15]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	1.70[11]	1.70[11]	6.912	8.19[09]	8.14[08]	237.70	8.07[08]	2.12[-15]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	1.54[09]	1.54[09]	6.903	8.68[09]	3.04[09]	237.74	1.78[09]	4.68[-15]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.30[09]	1.30[09]	6.898	4.80[09]	4.58[08]	237.77	3.13[08]	8.23[-16]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	9.54[10]	9.54[10]	6.871	7.51[09]	2.11[09]	237.89	2.08[09]	5.48[-15]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	2.35[09]	2.35[09]	6.862	6.98[09]	2.12[09]	237.93	1.55[09]	4.07[-15]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> G <sub>5/2</sub>	1.14[10]	1.14[10]	6.843	3.67[09]	4.02[08]	238.01	3.82[08]	1.01[-15]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.30[09]	1.30[09]	6.844	4.80[09]	2.32[08]	238.01	1.59[08]	4.19[-16]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p8p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	6.40[11]	6.40[11]	6.769	6.52[09]	1.10[09]	238.35	1.10[09]	2.92[-15]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p8p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	6.01[11]	6.01[11]	6.741	4.88[09]	9.93[08]	238.48	9.91[08]	2.64[-15]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p8p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	1.28[10]	1.28[10]	6.690	5.99[09]	2.32[09]	238.72	2.08[09]	5.57[-15]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p8p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	1.28[10]	1.28[10]	6.666	5.99[09]	1.15[08]	238.82	1.03[08]	2.76[-16]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p8p	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	9.54[10]	9.54[10]	6.665	4.96[09]	2.04[09]	238.83	1.99[09]	5.35[-15]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p8p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	1.28[10]	1.28[10]	6.666	5.99[09]	2.05[09]	238.83	1.84[09]	4.94[-15]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p8p	( <sup>3</sup> P) <sup>4</sup> D <sub>1/2</sub>	2.54[10]	2.54[10]	6.639	1.40[09]	3.65[08]	238.95	3.55[08]	9.56[-16]
2p <sup>3</sup>	( <sup>2</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p5p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2.11[14]	2.11[14]	10.210	1.19[10]	1.61[08]	239.64	1.60[08]	3.03[-16]
2p <sup>3</sup>	( <sup>2</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2.11[14]	2.11[14]	10.210	1.19[10]	3.41[08]	239.65	3.41[08]	6.43[-16]
2p <sup>3</sup>	( <sup>2</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p5p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2.04[12]	2.04[12]	10.077	1.96[10]	4.15[09]	240.26	4.14[09]	7.91[-15]
2p <sup>3</sup>	( <sup>2</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2.06[12]	2.06[12]	10.077	2.93[10]	7.24[09]	240.27	7.22[09]	1.38[-14]
2p <sup>3</sup>	( <sup>2</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2.04[12]	2.04[12]	10.077	1.96[10]	8.19[08]	240.27	8.17[08]	1.56[-15]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	8.81[09]	8.81[09]	5.938	7.48[10]	2.45[10]	242.22	1.19[10]	3.43[-14]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	4.16[09]	4.16[09]	5.938	5.62[10]	1.70[10]	242.22	5.22[09]	1.51[-14]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	4.16[09]	4.16[09]	5.938	5.62[10]	1.35[09]	242.22	4.16[08]	1.20[-15]
2p <sup>3</sup>	( <sup>2</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	8.55[11]	8.55[11]	9.610	6.72[10]	4.20[10]	242.45	4.12[10]	8.25[-14]
2p <sup>3</sup>	( <sup>2</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	8.55[11]	8.55[11]	9.610	6.72[10]	8.30[09]	242.46	8.14[09]	1.63[-14]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	3.44[11]	3.44[11]	5.888	5.80[09]	1.48[08]	242.46	1.47[08]	4.27[-16]
2p <sup>3</sup>	( <sup>2</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	8.59[11]	8.59[11]	9.608	1.00[11]	7.49[10]	242.47	7.34[10]	1.47[-13]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2.65[11]	2.65[11]	5.875	1.04[10]	2.27[08]	242.52	2.25[08]	6.55[-16]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	8.15[10]	8.15[10]	5.814	9.77[09]	1.47[08]	242.81	1.45[08]	4.24[-16]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	1.30[11]	1.30[11]	5.756	3.25[10]	8.10[08]	243.08	7.62[08]	2.24[-15]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	1.43[11]	1.43[11]	5.756	4.82[10]	1.25[09]	243.09	1.18[09]	3.47[-15]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	8.74[11]	8.74[11]	5.659	1.81[10]	1.53[08]	243.55	1.52[08]	4.52[-16]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	8.67[11]	8.67[11]	5.630	1.23[10]	1.26[08]	243.69	1.25[08]	3.74[-16]
2p <sup>3</sup>	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2.60[10]	2.60[10]	5.552	1.36[10]	5.11[08]	244.06	4.52[08]	1.36[-15]

Conf.	Low level <i>LSJ</i>	Conf.	Upper level <i>LSJ</i>	$A_a$ $s^{-1}$	$\Sigma A_a$ $s^{-1}$	$E_S$ eV	$\Sigma gA_r$ $s^{-1}$	$gA_r$ $s^{-1}$	$\lambda$ $\text{Å}$	$Q_d$ $s^{-1}$	$C_S^{\text{eff}}$ $\text{cm}^3/\text{s}$
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	5.62[10]	5.62[10]	5.530	8.55[09]	3.18[08]	244.17	2.96[08]	8.90[-16]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>4</sup> S <sub>3/2</sub>	4.98[09]	4.98[09]	5.525	5.31[09]	1.41[08]	244.19	1.11[08]	3.34[-16]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> P <sub>1/2</sub>	6.58[09]	6.58[09]	5.140	5.02[10]	1.59[10]	246.06	3.30[09]	1.03[-14]
$2p^3$	( <sup>4</sup> S) <sup>4</sup> S <sub>3/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	8.59[11]	8.59[11]	1.385	3.33[10]	3.26[08]	248.69	3.23[08]	1.47[-15]
$2p^3$	( <sup>4</sup> S) <sup>4</sup> S <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	9.64[08]	9.64[08]	1.316	9.85[10]	9.35[10]	249.04	1.79[09]	8.23[-15]
$2p^3$	( <sup>4</sup> S) <sup>4</sup> S <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	3.52[08]	3.52[08]	1.310	1.95[11]	1.85[11]	249.07	1.33[09]	6.09[-15]
$2p^3$	( <sup>4</sup> S) <sup>4</sup> S <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2.16[09]	2.16[09]	1.299	2.89[11]	2.74[11]	249.12	1.18[10]	5.41[-14]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.58[11]	3.58[11]	4.416	9.16[10]	3.95[09]	249.64	3.79[09]	1.28[-14]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.58[11]	3.58[11]	4.416	9.16[10]	3.71[10]	249.65	3.55[10]	1.20[-13]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	3.20[11]	3.20[11]	4.412	6.03[10]	2.45[10]	249.66	2.34[10]	7.87[-14]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	3.20[11]	3.20[11]	4.412	6.03[10]	2.83[09]	249.67	2.70[09]	9.10[-15]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	6.82[11]	6.82[11]	4.328	1.43[10]	5.47[09]	250.08	5.44[09]	1.85[-14]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.02[11]	3.02[11]	4.328	3.70[10]	1.28[10]	250.09	1.25[10]	4.24[-14]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.02[11]	3.02[11]	4.328	3.70[10]	1.06[10]	250.09	1.04[10]	3.52[-14]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	6.82[11]	6.82[11]	4.328	1.43[10]	6.22[08]	250.09	6.19[08]	2.10[-15]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2.07[10]	2.07[10]	4.319	6.67[10]	4.82[10]	250.14	3.44[10]	1.17[-13]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.02[11]	3.02[11]	4.291	3.70[10]	2.30[10]	250.27	2.26[10]	7.69[-14]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.02[11]	3.02[11]	4.291	3.70[10]	2.04[08]	250.28	2.00[08]	6.81[-16]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	3.68[11]	3.68[11]	4.216	1.11[10]	1.69[09]	250.66	1.68[09]	5.76[-15]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.03[09]	1.03[09]	4.215	1.28[10]	5.86[08]	250.66	2.30[08]	7.89[-16]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	5.81[08]	5.81[08]	4.141	6.20[10]	1.36[10]	251.04	4.92[08]	1.70[-15]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2.13[11]	2.13[11]	4.134	3.11[10]	7.92[09]	251.07	7.38[09]	2.55[-14]
$2p^3$	( <sup>4</sup> S) <sup>4</sup> S <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.48[10]	1.48[10]	0.822	7.31[09]	8.45[08]	251.53	7.81[08]	3.76[-15]
$2p^3$	( <sup>4</sup> S) <sup>4</sup> S <sub>3/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	7.30[09]	7.30[09]	0.753	4.34[10]	3.73[10]	251.88	1.87[10]	9.09[-14]
$2p^3$	( <sup>4</sup> S) <sup>4</sup> S <sub>3/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	1.46[09]	1.46[09]	0.746	2.52[10]	2.13[10]	251.92	4.02[09]	1.95[-14]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.69[11]	3.69[11]	3.956	7.14[10]	2.47[10]	251.98	2.40[10]	8.44[-14]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.69[11]	3.69[11]	3.956	7.14[10]	2.33[09]	251.98	2.26[09]	7.96[-15]
$2p^3$	( <sup>4</sup> S) <sup>4</sup> S <sub>3/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2.41[10]	2.41[10]	0.732	1.28[10]	1.09[10]	251.99	8.58[09]	4.18[-14]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	3.65[11]	3.65[11]	3.930	5.04[10]	1.82[10]	252.11	1.76[10]	6.22[-14]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	3.65[11]	3.65[11]	3.930	5.04[10]	2.15[09]	252.11	2.08[09]	7.36[-15]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.96[11]	1.96[11]	3.703	3.86[10]	1.87[10]	253.28	1.81[10]	6.54[-14]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.96[11]	1.96[11]	3.703	3.86[10]	2.20[09]	253.28	2.13[09]	7.71[-15]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	1.92[11]	1.92[11]	3.697	3.09[10]	1.25[10]	253.31	1.20[10]	4.35[-14]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	1.92[11]	1.92[11]	3.697	3.09[10]	2.57[09]	253.31	2.47[09]	8.93[-15]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> D <sub>5/2</sub>	5.44[11]	5.44[11]	3.691	8.43[10]	5.85[09]	253.34	5.70[09]	2.06[-14]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> D <sub>5/2</sub>	5.44[11]	5.44[11]	3.691	8.43[10]	4.16[10]	253.35	4.05[10]	1.47[-13]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> D <sub>3/2</sub>	5.47[11]	5.47[11]	3.679	5.46[10]	2.81[10]	253.40	2.74[10]	9.93[-14]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	7.29[09]	7.29[09]	3.680	4.88[09]	3.02[08]	253.40	2.58[08]	9.35[-16]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	7.29[09]	7.29[09]	3.680	4.88[09]	2.61[08]	253.40	2.24[08]	8.10[-16]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> D <sub>3/2</sub>	5.47[11]	5.47[11]	3.679	5.46[10]	2.11[09]	253.41	2.06[09]	7.46[-15]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> F <sub>5/2</sub>	2.29[08]	2.29[08]	3.636	2.56[11]	2.26[11]	253.62	1.20[09]	4.38[-15]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> F <sub>5/2</sub>	2.29[08]	2.29[08]	3.636	2.56[11]	2.27[10]	253.63	1.21[08]	4.40[-16]
$2p^3$	( <sup>2</sup> D) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> F <sub>7/2</sub>	1.32[10]	1.32[10]	3.632	3.43[11]	3.34[11]	253.65	7.83[10]	2.85[-13]
$2p^3$	( <sup>2</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2.84[11]	2.84[11]	6.919	5.78[09]	5.12[08]	255.92	5.10[08]	1.34[-15]
$2p^3$	( <sup>2</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2.84[11]	2.84[11]	6.919	5.78[09]	1.11[08]	255.93	1.10[08]	2.89[-16]
$2p^3$	( <sup>2</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	1.70[11]	1.70[11]	6.912	8.19[09]	5.99[08]	255.97	5.94[08]	1.56[-15]
$2p^3$	( <sup>2</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	9.54[10]	9.54[10]	6.871	7.51[09]	3.30[08]	256.18	3.25[08]	8.57[-16]
$2p^3$	( <sup>2</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p8p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	1.59[13]	1.59[13]	6.856	2.76[09]	5.17[08]	256.25	5.17[08]	1.36[-15]
$2p^3$	( <sup>2</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p8p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	1.59[13]	1.59[13]	6.856	2.76[09]	8.51[08]	256.26	8.51[08]	2.24[-15]
$2p^3$	( <sup>2</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p8p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	6.40[11]	6.40[11]	6.769	6.52[09]	1.05[08]	256.72	1.05[08]	2.79[-16]
$2p^3$	( <sup>2</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p8p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	1.28[10]	1.28[10]	6.690	5.99[09]	3.05[08]	257.15	2.73[08]	7.32[-16]
$2p^3$	( <sup>2</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p8p	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	9.54[10]	9.54[10]	6.665	4.96[09]	1.48[08]	257.27	1.44[08]	3.87[-16]
$2p^3$	( <sup>2</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p8p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	1.28[10]	1.28[10]	6.666	5.99[09]	2.66[08]	257.27	2.38[08]	6.41[-16]

Low level	Upper level	$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{\text{eff}}$		
Conf.	Conf. $LSJ$	Conf. $LSJ$	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$\text{\AA}$	$s^{-1}$	$\text{cm}^3/s$		
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p8p$	$(^3P) ^2P_{1/2}$	9.54[10]	9.54[10]	6.665	4.96[09]	1.35[08]	257.28	1.32[08]	3.55[-16]
$2p^3$	$(^2D) ^2D_{5/2}$	$2p^23d$	$(^3P) ^2D_{5/2}$	6.10[11]	6.10[11]	2.761	1.66[11]	6.52[10]	258.25	6.24[10]	2.48[-13]
$2p^3$	$(^2D) ^2D_{3/2}$	$2p^23d$	$(^3P) ^2D_{5/2}$	6.10[11]	6.10[11]	2.761	1.66[11]	6.72[09]	258.25	6.43[09]	2.55[-14]
$2p^3$	$(^2D) ^2D_{3/2}$	$2p^23d$	$(^3P) ^2D_{3/2}$	6.22[11]	6.22[11]	2.758	1.09[11]	4.01[10]	258.26	3.84[10]	1.52[-13]
$2p^3$	$(^2D) ^2D_{5/2}$	$2p^23d$	$(^3P) ^2D_{3/2}$	6.22[11]	6.22[11]	2.758	1.09[11]	4.83[09]	258.27	4.63[09]	1.84[-14]
$2p^3$	$(^2P) ^2P_{1/2}$	$2s2p7f$	$(^3P) ^2D_{3/2}$	3.44[11]	3.44[11]	5.888	5.80[09]	7.15[08]	261.48	7.12[08]	2.07[-15]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p7f$	$(^3P) ^2D_{3/2}$	3.44[11]	3.44[11]	5.888	5.80[09]	1.57[08]	261.49	1.57[08]	4.55[-16]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p7f$	$(^3P) ^2D_{5/2}$	2.65[11]	2.65[11]	5.875	1.04[10]	1.12[09]	261.57	1.12[09]	3.25[-15]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p7f$	$(^3P) ^2F_{5/2}$	4.89[10]	4.89[10]	5.825	8.97[09]	3.67[08]	261.84	3.56[08]	1.04[-15]
$2p^3$	$(^2P) ^2P_{1/2}$	$2p^23d$	$(^1D) ^2S_{1/2}$	1.03[14]	1.03[14]	5.805	9.73[09]	2.43[09]	261.94	2.43[09]	7.12[-15]
$2p^3$	$(^2P) ^2P_{3/2}$	$2p^23d$	$(^1D) ^2S_{1/2}$	1.03[14]	1.03[14]	5.805	9.73[09]	4.85[09]	261.95	4.85[09]	1.42[-14]
$2p^3$	$(^2P) ^2P_{1/2}$	$2s2p4f$	$(^1P) ^2D_{3/2}$	1.30[11]	1.30[11]	5.756	3.25[10]	7.53[09]	262.21	7.09[09]	2.09[-14]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p4f$	$(^1P) ^2D_{5/2}$	1.43[11]	1.43[11]	5.756	4.82[10]	1.30[10]	262.22	1.23[10]	3.63[-14]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p4f$	$(^1P) ^2D_{3/2}$	1.30[11]	1.30[11]	5.756	3.25[10]	1.43[09]	262.22	1.34[09]	3.95[-15]
$2p^3$	$(^2P) ^2P_{1/2}$	$2s2p7p$	$(^3P) ^2S_{1/2}$	3.80[12]	3.80[12]	5.751	1.70[10]	4.27[09]	262.24	4.26[09]	1.26[-14]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p7p$	$(^3P) ^2S_{1/2}$	3.80[12]	3.80[12]	5.751	1.70[10]	9.19[09]	262.25	9.17[09]	2.70[-14]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p7p$	$(^3P) ^2D_{5/2}$	8.74[11]	8.74[11]	5.659	1.81[10]	2.41[09]	262.76	2.40[09]	7.14[-15]
$2p^3$	$(^2P) ^2P_{1/2}$	$2s2p7p$	$(^3P) ^2D_{3/2}$	8.67[11]	8.67[11]	5.630	1.23[10]	1.05[09]	262.92	1.05[09]	3.12[-15]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p7p$	$(^3P) ^2D_{3/2}$	8.67[11]	8.67[11]	5.630	1.23[10]	4.83[08]	262.93	4.81[08]	1.43[-15]
$2p^3$	$(^2D) ^2D_{5/2}$	$2s2p5f$	$(^3P) ^2F_{7/2}$	1.14[09]	1.14[09]	1.891	3.41[10]	6.37[09]	263.02	1.34[09]	5.83[-15]
$2p^3$	$(^2D) ^2D_{3/2}$	$2s2p5f$	$(^3P) ^2F_{5/2}$	1.48[09]	1.48[09]	1.872	2.52[10]	4.30[09]	263.12	1.12[09]	4.85[-15]
$2p^3$	$(^2P) ^2P_{1/2}$	$2s2p7p$	$(^3P) ^2P_{3/2}$	2.60[10]	2.60[10]	5.552	1.36[10]	4.55[08]	263.35	4.02[08]	1.21[-15]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p7p$	$(^3P) ^2P_{3/2}$	2.60[10]	2.60[10]	5.552	1.36[10]	1.06[09]	263.36	9.35[08]	2.81[-15]
$2p^3$	$(^2P) ^2P_{1/2}$	$2s2p7p$	$(^3P) ^2P_{1/2}$	5.62[10]	5.62[10]	5.530	8.55[09]	8.05[08]	263.47	7.48[08]	2.25[-15]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p7p$	$(^3P) ^2P_{1/2}$	5.62[10]	5.62[10]	5.530	8.55[09]	2.42[08]	263.48	2.25[08]	6.77[-16]
$2p^3$	$(^2P) ^2P_{1/2}$	$2s2p7p$	$(^3P) ^4S_{3/2}$	4.98[09]	4.98[09]	5.525	5.31[09]	1.44[08]	263.50	1.14[08]	3.43[-16]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p7p$	$(^3P) ^4S_{3/2}$	4.98[09]	4.98[09]	5.525	5.31[09]	4.15[08]	263.51	3.28[08]	9.87[-16]
$2p^3$	$(^2P) ^2P_{1/2}$	$2p^23d$	$(^1D) ^2P_{1/2}$	6.58[09]	6.58[09]	5.140	5.02[10]	2.11[10]	265.68	4.37[09]	1.37[-14]
$2p^3$	$(^2P) ^2P_{3/2}$	$2p^23d$	$(^1D) ^2P_{1/2}$	6.58[09]	6.58[09]	5.140	5.02[10]	1.04[10]	265.69	2.16[09]	6.75[-15]
$2p^3$	$(^2D) ^2D_{3/2}$	$2s2p5f$	$(^3P) ^2D_{3/2}$	9.64[11]	9.64[11]	1.400	2.27[10]	6.00[09]	265.78	5.96[09]	2.71[-14]
$2p^3$	$(^2D) ^2D_{5/2}$	$2s2p5f$	$(^3P) ^2D_{3/2}$	9.64[11]	9.64[11]	1.400	2.27[10]	7.76[08]	265.79	7.72[08]	3.51[-15]
$2p^3$	$(^2D) ^2D_{5/2}$	$2s2p5f$	$(^3P) ^2D_{5/2}$	8.59[11]	8.59[11]	1.385	3.33[10]	9.52[09]	265.87	9.46[09]	4.31[-14]
$2p^3$	$(^2D) ^2D_{3/2}$	$2s2p5f$	$(^3P) ^2D_{5/2}$	8.59[11]	8.59[11]	1.385	3.33[10]	4.81[08]	265.87	4.78[08]	2.18[-15]
$2p^3$	$(^2D) ^2D_{5/2}$	$2s2p5p$	$(^3P) ^2D_{5/2}$	4.70[12]	4.70[12]	0.953	2.90[10]	1.69[09]	268.36	1.68[09]	8.01[-15]
$2p^3$	$(^2D) ^2D_{3/2}$	$2s2p5p$	$(^3P) ^2D_{3/2}$	4.45[12]	4.45[12]	0.926	2.01[10]	1.29[09]	268.51	1.29[09]	6.15[-15]
$2p^3$	$(^2D) ^2D_{3/2}$	$2p^23d$	$(^3P) ^2P_{1/2}$	4.53[10]	4.53[10]	0.892	2.57[10]	5.42[09]	268.71	4.23[09]	2.02[-14]
$2p^3$	$(^2D) ^2D_{5/2}$	$2p^23d$	$(^3P) ^2P_{3/2}$	4.76[09]	4.76[09]	0.885	4.66[10]	9.18[09]	268.75	2.67[09]	1.28[-14]
$2p^3$	$(^2D) ^2D_{3/2}$	$2p^23d$	$(^3P) ^2P_{3/2}$	4.76[09]	4.76[09]	0.885	4.66[10]	8.88[08]	268.75	2.58[08]	1.24[-15]
$2p^3$	$(^2D) ^2D_{5/2}$	$2p^23d$	$(^3P) ^4D_{7/2}$	1.38[08]	1.38[08]	0.836	1.55[10]	8.40[09]	269.04	5.62[08]	2.70[-15]
$2p^3$	$(^2D) ^2D_{3/2}$	$2p^23d$	$(^3P) ^4D_{5/2}$	1.48[10]	1.48[10]	0.822	7.31[09]	8.47[08]	269.12	7.83[08]	3.77[-15]
$2p^3$	$(^2D) ^2D_{5/2}$	$2p^23d$	$(^3P) ^2F_{7/2}$	9.99[08]	9.99[08]	0.806	6.41[10]	5.74[10]	269.22	6.36[09]	3.07[-14]
$2p^3$	$(^2D) ^2D_{3/2}$	$2p^23d$	$(^3P) ^2F_{5/2}$	2.37[09]	2.37[09]	0.786	5.39[10]	4.57[10]	269.33	9.55[09]	4.62[-14]
$2p^3$	$(^2D) ^2D_{5/2}$	$2p^23d$	$(^3P) ^2F_{5/2}$	2.37[09]	2.37[09]	0.786	5.39[10]	3.02[09]	269.33	6.30[08]	3.05[-15]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p4p$	$(^1P) ^2D_{5/2}$	3.58[11]	3.58[11]	4.416	9.16[10]	3.57[10]	269.87	3.43[10]	1.15[-13]
$2p^3$	$(^2P) ^2P_{1/2}$	$2s2p4p$	$(^1P) ^2D_{3/2}$	3.20[11]	3.20[11]	4.412	6.03[10]	1.94[10]	269.88	1.85[10]	6.22[-14]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p4p$	$(^1P) ^2D_{3/2}$	3.20[11]	3.20[11]	4.412	6.03[10]	3.78[09]	269.89	3.61[09]	1.22[-14]
$2p^3$	$(^2P) ^2P_{1/2}$	$2s2p6f$	$(^3P) ^2D_{3/2}$	6.82[11]	6.82[11]	4.328	1.43[10]	2.51[08]	270.38	2.49[08]	8.46[-16]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p4p$	$(^1P) ^2S_{1/2}$	1.54[14]	1.54[14]	4.325	9.31[09]	1.67[09]	270.39	1.67[09]	5.66[-15]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p6f$	$(^3P) ^2D_{5/2}$	3.02[11]	3.02[11]	4.328	3.70[10]	2.65[08]	270.39	2.60[08]	8.82[-16]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p4p$	$(^1P) ^2S_{1/2}$	1.54[14]	1.54[14]	4.325	9.31[09]	2.83[09]	270.41	2.83[09]	9.62[-15]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p6f$	$(^3P) ^2D_{5/2}$	3.02[11]	3.02[11]	4.291	3.70[10]	7.92[08]	270.61	7.76[08]	2.64[-15]
$2p^3$	$(^2D) ^2D_{3/2}$	$2s2p5p$	$(^3P) ^2P_{1/2}$	4.91[09]	4.91[09]	0.522	2.16[10]	2.43[09]	270.88	7.58[08]	3.76[-15]
$2p^3$	$(^2D) ^2D_{3/2}$	$2p^23d$	$(^3P) ^2P_{3/2}$	4.76[09]	4.76[09]	0.517	4.66[10]	8.16[08]	270.91	2.37[08]	1.18[-15]



Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma g A_r$	$g A_r$	$\lambda$	$Q_d$	$C_S^{\text{eff}}$
Conf.	$LSJ$	Conf.	$LSJ$	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	$\text{\AA}$	$s^{-1}$	$\text{cm}^3/s$
$2p^3$	$(^2D) ^2D_{5/2}$	$2p^23d$	$(^3P) ^2P_{3/2}$	4.76[09]	4.76[09]	0.517	4.66[10]	5.26[09]	270.92	1.53[09]	7.59[-15]
$2p^3$	$(^2P) ^2P_{1/2}$	$2s2p4p$	$(^1P) ^2P_{3/2}$	5.81[08]	5.81[08]	4.141	6.20[10]	3.70[09]	271.49	1.33[08]	4.62[-16]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p4p$	$(^1P) ^2P_{3/2}$	5.81[08]	5.81[08]	4.141	6.20[10]	1.69[10]	271.50	6.11[08]	2.11[-15]
$2p^3$	$(^2P) ^2P_{1/2}$	$2s2p4p$	$(^1P) ^2P_{1/2}$	2.13[11]	2.13[11]	4.134	3.11[10]	6.48[09]	271.53	6.04[09]	2.09[-14]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p4p$	$(^1P) ^2P_{1/2}$	2.13[11]	2.13[11]	4.134	3.11[10]	3.75[09]	271.54	3.49[09]	1.21[-14]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p6p$	$(^3P) ^2D_{5/2}$	3.69[11]	3.69[11]	3.956	7.14[10]	3.49[10]	272.60	3.38[10]	1.19[-13]
$2p^3$	$(^2P) ^2P_{1/2}$	$2s2p6p$	$(^3P) ^2D_{3/2}$	3.65[11]	3.65[11]	3.930	5.04[10]	1.96[10]	272.74	1.90[10]	6.70[-14]
$2p^3$	$(^2P) ^2P_{1/2}$	$2s2p6p$	$(^3P) ^2S_{1/2}$	3.79[13]	3.79[13]	3.929	1.91[10]	2.86[09]	272.75	2.86[09]	1.01[-14]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p6p$	$(^3P) ^2S_{1/2}$	3.79[13]	3.79[13]	3.929	1.91[10]	4.91[09]	272.76	4.91[09]	1.73[-14]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p6p$	$(^3P) ^2D_{3/2}$	3.65[11]	3.65[11]	3.930	5.04[10]	4.34[09]	272.76	4.19[09]	1.48[-14]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p6p$	$(^3P) ^4D_{5/2}$	1.96[11]	1.96[11]	3.703	3.86[10]	8.55[09]	274.13	8.28[09]	2.99[-14]
$2p^3$	$(^2P) ^2P_{1/2}$	$2s2p6p$	$(^3P) ^2P_{3/2}$	1.92[11]	1.92[11]	3.697	3.09[10]	6.01[09]	274.15	5.77[09]	2.09[-14]
$2p^3$	$(^2P) ^2P_{3/2}$	$2p^23d$	$(^1D) ^2D_{5/2}$	5.44[11]	5.44[11]	3.691	8.43[10]	1.74[10]	274.20	1.69[10]	6.13[-14]
$2p^3$	$(^2P) ^2P_{1/2}$	$2s2p6p$	$(^3P) ^4D_{3/2}$	7.29[09]	7.29[09]	3.680	4.88[09]	3.26[08]	274.25	2.79[08]	1.01[-15]
$2p^3$	$(^2P) ^2P_{3/2}$	$2p^23d$	$(^1D) ^2D_{3/2}$	5.47[11]	5.47[11]	3.679	5.46[10]	6.58[09]	274.26	6.42[09]	2.33[-14]
$2p^3$	$(^2P) ^2P_{3/2}$	$2p^23d$	$(^1D) ^2D_{3/2}$	5.47[11]	5.47[11]	3.679	5.46[10]	3.01[09]	274.27	2.94[09]	1.07[-14]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p6p$	$(^3P) ^4D_{3/2}$	7.29[09]	7.29[09]	3.680	4.88[09]	1.35[08]	274.27	1.15[08]	4.18[-16]
$2p^3$	$(^2P) ^2P_{1/2}$	$2s2p6p$	$(^3P) ^2P_{1/2}$	2.18[09]	2.18[09]	3.665	3.61[09]	1.84[08]	274.35	1.01[08]	3.65[-16]
$2p^3$	$(^2P) ^2P_{1/2}$	$2p^23s$	$(^1S) ^2S_{1/2}$	6.84[12]	6.84[12]	2.905	3.75[10]	9.62[09]	279.04	9.59[09]	3.76[-14]
$2p^3$	$(^2P) ^2P_{3/2}$	$2p^23s$	$(^1S) ^2S_{1/2}$	6.84[12]	6.84[12]	2.905	3.75[10]	1.90[10]	279.05	1.89[10]	7.41[-14]
$2p^3$	$(^2P) ^2P_{1/2}$	$2p^23d$	$(^3P) ^2D_{3/2}$	6.22[11]	6.22[11]	2.758	1.09[11]	3.99[10]	279.96	3.83[10]	1.52[-13]
$2p^3$	$(^2P) ^2P_{3/2}$	$2p^23d$	$(^3P) ^2D_{5/2}$	6.10[11]	6.10[11]	2.761	1.66[11]	7.03[10]	279.96	6.73[10]	2.67[-13]
$2p^3$	$(^2P) ^2P_{3/2}$	$2p^23d$	$(^3P) ^2D_{3/2}$	6.22[11]	6.22[11]	2.758	1.09[11]	8.38[09]	279.98	8.03[09]	3.19[-14]
$2p^3$	$(^2P) ^2P_{1/2}$	$2s2p5f$	$(^3P) ^2D_{3/2}$	9.64[11]	9.64[11]	1.400	2.27[10]	9.30[09]	288.82	9.24[09]	4.21[-14]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p5f$	$(^3P) ^2D_{3/2}$	9.64[11]	9.64[11]	1.400	2.27[10]	2.14[09]	288.83	2.13[09]	9.68[-15]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p5f$	$(^3P) ^2D_{5/2}$	8.59[11]	8.59[11]	1.385	3.33[10]	1.62[10]	288.93	1.61[10]	7.33[-14]
$2p^3$	$(^2P) ^2P_{1/2}$	$2s2p5p$	$(^3P) ^2S_{1/2}$	1.06[13]	1.06[13]	1.069	1.06[10]	8.46[08]	291.06	8.46[08]	3.98[-15]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p5p$	$(^3P) ^2S_{1/2}$	1.06[13]	1.06[13]	1.069	1.06[10]	2.68[09]	291.08	2.68[09]	1.26[-14]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p5p$	$(^3P) ^2D_{5/2}$	4.70[12]	4.70[12]	0.953	2.90[10]	8.81[08]	291.87	8.80[08]	4.19[-15]
$2p^3$	$(^2P) ^2P_{1/2}$	$2s2p5p$	$(^3P) ^2D_{3/2}$	4.45[12]	4.45[12]	0.926	2.01[10]	1.08[09]	292.05	1.08[09]	5.14[-15]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p5p$	$(^3P) ^2D_{3/2}$	4.45[12]	4.45[12]	0.926	2.01[10]	3.69[08]	292.06	3.69[08]	1.76[-15]
$2p^3$	$(^2P) ^2P_{1/2}$	$2p^23d$	$(^3P) ^2P_{1/2}$	4.53[10]	4.53[10]	0.892	2.57[10]	1.12[10]	292.28	8.70[09]	4.16[-14]
$2p^3$	$(^2P) ^2P_{3/2}$	$2p^23d$	$(^3P) ^2P_{1/2}$	4.53[10]	4.53[10]	0.892	2.57[10]	4.91[09]	292.29	3.83[09]	1.83[-14]
$2p^3$	$(^2P) ^2P_{1/2}$	$2p^23d$	$(^3P) ^2P_{3/2}$	4.76[09]	4.76[09]	0.885	4.66[10]	4.29[09]	292.33	1.24[09]	5.96[-15]
$2p^3$	$(^2P) ^2P_{3/2}$	$2p^23d$	$(^3P) ^2P_{3/2}$	4.76[09]	4.76[09]	0.885	4.66[10]	2.34[10]	292.34	6.80[09]	3.26[-14]
$2p^3$	$(^2P) ^2P_{1/2}$	$2s2p5p$	$(^3P) ^2P_{1/2}$	4.91[09]	4.91[09]	0.522	2.16[10]	6.37[09]	294.85	1.99[09]	9.88[-15]
$2p^3$	$(^2P) ^2P_{3/2}$	$2s2p5p$	$(^3P) ^2P_{1/2}$	4.91[09]	4.91[09]	0.522	2.16[10]	3.31[09]	294.87	1.03[09]	5.13[-15]
$2p^3$	$(^2P) ^2P_{1/2}$	$2p^23d$	$(^3P) ^2P_{3/2}$	4.76[09]	4.76[09]	0.517	4.66[10]	3.80[09]	294.89	1.10[09]	5.48[-15]
$2p^3$	$(^2P) ^2P_{3/2}$	$2p^23d$	$(^3P) ^2P_{3/2}$	4.76[09]	4.76[09]	0.517	4.66[10]	1.82[10]	294.90	5.28[09]	2.63[-14]
$2s^23p$	$(^1S) ^2P_{3/2}$	$2s2p8p$	$(^3P) ^2S_{1/2}$	1.59[13]	1.59[13]	6.856	2.76[09]	1.08[08]	345.40	1.07[08]	2.83[-16]
$2s^23p$	$(^1S) ^2P_{3/2}$	$2s2p8p$	$(^3P) ^2D_{5/2}$	6.40[11]	6.40[11]	6.769	6.52[09]	2.45[08]	346.24	2.44[08]	6.49[-16]
$2s^23p$	$(^1S) ^2P_{1/2}$	$2s2p8p$	$(^3P) ^2D_{3/2}$	6.01[11]	6.01[11]	6.741	4.88[09]	1.00[08]	346.41	1.00[08]	2.67[-16]
$2s^23p$	$(^1S) ^2P_{3/2}$	$2s2p7p$	$(^3P) ^2D_{5/2}$	8.74[11]	8.74[11]	5.659	1.81[10]	1.86[08]	357.31	1.86[08]	5.52[-16]
$2s2p3s$	$(^3P) ^4P_{3/2}$	$2s2p8p$	$(^3P) ^4P_{1/2}$	1.72[11]	1.72[11]	6.699	6.56[08]	2.16[08]	415.15	2.15[08]	5.76[-16]
$2s2p3s$	$(^3P) ^4P_{5/2}$	$2s2p8p$	$(^3P) ^4P_{5/2}$	7.73[09]	7.73[09]	6.727	1.76[09]	6.57[08]	415.19	6.33[08]	1.69[-15]
$2s2p3s$	$(^3P) ^4P_{3/2}$	$2s2p8p$	$(^3P) ^2P_{3/2}$	1.28[10]	1.28[10]	6.690	5.99[09]	2.23[08]	415.28	2.00[08]	5.36[-16]
$2s2p3s$	$(^3P) ^4P_{1/2}$	$2s2p8p$	$(^3P) ^2P_{3/2}$	1.28[10]	1.28[10]	6.666	5.99[09]	1.18[08]	415.36	1.05[08]	2.83[-16]
$2s2p3s$	$(^3P) ^4P_{1/2}$	$2s2p8p$	$(^3P) ^4D_{3/2}$	5.25[09]	5.25[09]	6.649	1.37[09]	3.98[08]	415.60	3.74[08]	1.01[-15]
$2s2p3s$	$(^3P) ^4P_{3/2}$	$2s2p8p$	$(^3P) ^2P_{3/2}$	1.28[10]	1.28[10]	6.666	5.99[09]	2.21[08]	415.61	1.98[08]	5.32[-16]
$2s2p3s$	$(^3P) ^4P_{3/2}$	$2s2p8p$	$(^3P) ^4D_{5/2}$	9.31[09]	9.31[09]	6.664	1.95[09]	8.17[08]	415.64	7.90[08]	2.12[-15]
$2s2p3s$	$(^3P) ^4P_{1/2}$	$2s2p8p$	$(^3P) ^4D_{1/2}$	2.54[10]	2.54[10]	6.639	1.40[09]	2.43[08]	415.74	2.37[08]	6.37[-16]
$2s2p3s$	$(^3P) ^4P_{3/2}$	$2s2p8p$	$(^3P) ^4D_{3/2}$	5.25[09]	5.25[09]	6.649	1.37[09]	2.12[08]	415.85	1.99[08]	5.36[-16]
$2s2p3s$	$(^3P) ^4P_{5/2}$	$2s2p8p$	$(^3P) ^4D_{5/2}$	9.31[09]	9.31[09]	6.664	1.95[09]	1.20[08]	416.07	1.16[08]	3.11[-16]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{\text{eff}}$
Conf.	LSJ	Conf.	LSJ	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	Å	$s^{-1}$	$\text{cm}^3/\text{s}$
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p8p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	4.11[12]	1.30[13]	16.040	2.52[10]	5.01[08]	421.85	1.59[08]	1.67[-16]
2s2p3s	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	6.20[09]	6.20[09]	5.593	1.26[09]	1.64[08]	431.58	1.59[08]	4.76[-16]
2s2p3s	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	3.04[09]	3.04[09]	5.494	1.11[09]	1.21[08]	432.34	1.11[08]	3.35[-16]
2s2p3s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	5.69[09]	5.69[09]	5.509	1.52[09]	2.74[08]	432.38	2.62[08]	7.91[-16]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	4.48[12]	1.60[13]	14.869	2.14[10]	5.44[08]	439.35	1.52[08]	1.80[-16]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p8p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	6.40[11]	6.40[11]	6.769	6.52[09]	2.09[08]	440.69	2.08[08]	5.54[-16]
2s <sup>2</sup> 4f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p6f	( <sup>1</sup> P) <sup>2</sup> G <sub>9/2</sub>	7.72[13]	7.88[13]	13.555	3.85[10]	1.18[08]	455.40	1.16[08]	1.56[-16]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	3.80[12]	3.80[12]	5.751	1.70[10]	1.11[08]	456.67	1.11[08]	3.27[-16]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	3.80[12]	3.80[12]	5.751	1.70[10]	3.09[08]	457.24	3.08[08]	9.08[-16]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	8.67[11]	8.67[11]	5.630	1.23[10]	9.78[08]	458.71	9.75[08]	2.90[-15]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	8.74[11]	8.74[11]	5.659	1.81[10]	2.09[09]	458.79	2.08[09]	6.19[-15]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	8.67[11]	8.67[11]	5.630	1.23[10]	4.22[08]	459.29	4.20[08]	1.25[-15]
2s2p3s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	4.21[10]	4.21[10]	3.798	9.50[08]	2.00[08]	459.82	1.98[08]	7.09[-16]
2s2p3s	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2.10[08]	2.10[08]	3.825	2.84[09]	5.65[08]	459.88	1.74[08]	6.21[-16]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2.60[10]	2.60[10]	5.552	1.36[10]	3.14[08]	460.04	2.77[08]	8.33[-16]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	5.62[10]	5.62[10]	5.530	8.55[09]	4.09[08]	460.41	3.80[08]	1.14[-15]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2.60[10]	2.60[10]	5.552	1.36[10]	5.90[08]	460.61	5.22[08]	1.57[-15]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	5.62[10]	5.62[10]	5.530	8.55[09]	1.58[08]	460.99	1.47[08]	4.42[-16]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>4</sup> S <sub>3/2</sub>	4.98[09]	4.98[09]	5.525	5.31[09]	2.02[08]	461.07	1.59[08]	4.80[-16]
2s2p3s	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	1.92[11]	1.92[11]	3.697	3.09[10]	1.28[08]	461.23	1.23[08]	4.45[-16]
2s2p3s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.96[11]	1.96[11]	3.703	3.86[10]	5.71[08]	461.44	5.53[08]	2.00[-15]
2s2p3s	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> D <sub>1/2</sub>	2.43[09]	2.43[09]	3.684	2.96[09]	1.72[08]	461.46	1.07[08]	3.86[-16]
2s2p3s	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	7.29[09]	7.29[09]	3.680	4.88[09]	2.15[08]	461.52	1.84[08]	6.68[-16]
2s2p3s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> D <sub>5/2</sub>	5.44[11]	5.44[11]	3.691	8.43[10]	2.38[08]	461.66	2.32[08]	8.40[-16]
2s2p3s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	7.29[09]	7.29[09]	3.680	4.88[09]	2.91[08]	461.84	2.49[08]	9.01[-16]
2s2p3s	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.96[11]	1.96[11]	3.703	3.86[10]	1.65[08]	461.97	1.60[08]	5.78[-16]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	1.54[14]	1.54[14]	4.325	9.31[09]	1.39[08]	482.61	1.39[08]	4.71[-16]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	3.65[11]	3.65[11]	3.930	5.04[10]	9.85[08]	489.49	9.52[08]	3.36[-15]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.69[11]	3.69[11]	3.956	7.14[10]	1.84[09]	489.64	1.78[09]	6.27[-15]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	3.65[11]	3.65[11]	3.930	5.04[10]	2.43[08]	490.14	2.35[08]	8.31[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p5f	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.31[14]	1.39[14]	10.922	3.97[10]	1.19[08]	493.10	1.13[08]	1.98[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p5f	( <sup>1</sup> P) <sup>2</sup> G <sub>9/2</sub>	1.31[14]	1.39[14]	10.923	4.97[10]	1.50[08]	493.69	1.42[08]	2.50[-16]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	1.92[11]	1.92[11]	3.697	3.09[10]	3.19[08]	494.70	3.06[08]	1.11[-15]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	7.29[09]	7.29[09]	3.680	4.88[09]	1.85[08]	495.04	1.58[08]	5.74[-16]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> D <sub>3/2</sub>	5.47[11]	5.47[11]	3.679	5.46[10]	1.75[08]	495.06	1.70[08]	6.18[-16]
2s <sup>2</sup> 5f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2s2p8f	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	3.41[13]	4.56[13]	16.254	2.61[10]	1.45[08]	496.06	1.08[08]	1.12[-16]
2s <sup>2</sup> 5f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p8f	( <sup>1</sup> P) <sup>2</sup> G <sub>9/2</sub>	3.41[13]	4.57[13]	16.254	3.26[10]	1.88[08]	496.06	1.40[08]	1.45[-16]
2s <sup>2</sup> 4f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2s2p5f	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.31[14]	1.39[14]	10.922	3.97[10]	1.34[08]	504.13	1.27[08]	2.23[-16]
2s <sup>2</sup> 4f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p5f	( <sup>1</sup> P) <sup>2</sup> G <sub>9/2</sub>	1.31[14]	1.39[14]	10.923	4.97[10]	1.77[08]	504.14	1.67[08]	2.94[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2.06[12]	2.06[12]	10.077	2.93[10]	5.62[08]	516.25	5.61[08]	1.07[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p5p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2.04[12]	2.04[12]	10.077	1.96[10]	3.27[08]	516.61	3.27[08]	6.24[-16]
2s2p3s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.48[10]	1.48[10]	0.822	7.31[09]	5.64[08]	516.87	5.21[08]	2.51[-15]
2s2p3s	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	1.48[10]	1.48[10]	0.822	7.31[09]	3.34[08]	517.53	3.09[08]	1.49[-15]
2s2p3s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	7.30[09]	7.30[09]	0.753	4.34[10]	3.95[08]	518.35	1.99[08]	9.64[-16]
2s2p3s	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2.41[10]	2.41[10]	0.732	1.28[10]	3.47[08]	518.80	2.74[08]	1.33[-15]
2s2p3s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	7.30[09]	7.30[09]	0.753	4.34[10]	8.37[08]	519.02	4.21[08]	2.04[-15]
2s2p3s	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	1.46[09]	1.46[09]	0.746	2.52[10]	6.42[08]	519.17	1.21[08]	5.89[-16]
2s2p3s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	5.75[08]	5.75[08]	0.416	9.16[09]	8.63[08]	525.76	2.36[08]	1.18[-15]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2.11[14]	2.11[14]	10.210	1.19[10]	1.53[08]	526.24	1.53[08]	2.88[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	8.59[11]	8.59[11]	9.608	1.00[11]	1.17[08]	526.53	1.15[08]	2.31[-16]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2.06[12]	2.06[12]	10.077	2.93[10]	1.46[09]	529.22	1.45[09]	2.78[-15]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2.04[12]	2.04[12]	10.077	1.96[10]	1.63[08]	529.23	1.62[08]	3.10[-16]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p5p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2.04[12]	2.04[12]	10.077	1.96[10]	7.92[08]	529.26	7.90[08]	1.51[-15]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_{\text{eff}}^{\text{eff}}$
Conf.	<i>LSJ</i>	Conf.	<i>LSJ</i>	$\text{s}^{-1}$	$\text{s}^{-1}$	eV	$\text{s}^{-1}$	$\text{s}^{-1}$	$\text{\AA}$	$\text{s}^{-1}$	$\text{cm}^3/\text{s}$
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	4.90[09]	4.90[09]	6.905	6.80[09]	1.63[08]	539.55	1.43[08]	3.75[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.30[09]	1.30[09]	6.898	4.80[09]	2.24[08]	539.72	1.53[08]	4.03[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	9.54[10]	9.54[10]	6.871	7.51[09]	1.94[08]	539.76	1.92[08]	5.05[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	1.92[08]	1.92[08]	6.894	5.26[09]	5.65[08]	539.79	1.51[08]	3.97[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	1.74[10]	1.74[10]	6.860	2.56[09]	1.20[08]	540.01	1.15[08]	3.04[-16]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	8.55[11]	8.55[11]	9.610	6.72[10]	2.70[08]	540.02	2.65[08]	5.31[-16]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	8.59[11]	8.59[11]	9.608	1.00[11]	4.72[08]	540.03	4.63[08]	9.28[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	2.35[09]	2.35[09]	6.862	6.98[09]	5.58[08]	540.20	4.07[08]	1.07[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	1.92[08]	1.92[08]	6.894	5.26[09]	5.11[08]	540.26	1.37[08]	3.59[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> G <sub>5/2</sub>	1.14[10]	1.14[10]	6.843	3.67[09]	7.91[08]	540.42	7.51[08]	1.98[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	4.62[09]	4.62[09]	6.868	5.31[09]	1.31[08]	540.42	1.14[08]	3.01[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.30[09]	1.30[09]	6.844	4.80[09]	6.39[08]	540.64	4.38[08]	1.16[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	1.92[08]	1.92[08]	6.859	5.26[09]	1.12[09]	540.64	2.99[08]	7.88[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p8f	( <sup>1</sup> P) <sup>2</sup> G <sub>9/2</sub>	3.41[13]	4.57[13]	16.254	3.26[10]	1.50[09]	543.67	1.12[09]	1.16[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p8f	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	3.41[13]	4.56[13]	16.254	2.61[10]	1.16[09]	543.67	8.66[08]	8.92[-16]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	9.64[11]	9.64[11]	1.400	2.27[10]	1.60[08]	543.82	1.59[08]	7.23[-16]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	8.59[11]	8.59[11]	1.385	3.33[10]	3.16[08]	544.98	3.14[08]	1.43[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	8.50[09]	8.50[09]	6.907	2.66[09]	2.08[08]	550.06	1.93[08]	5.06[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.85[10]	1.85[10]	6.903	4.20[09]	1.31[08]	550.17	1.26[08]	3.31[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.85[10]	1.85[10]	6.903	4.20[09]	4.65[08]	550.31	4.48[08]	1.18[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.30[09]	1.30[09]	6.898	4.80[09]	5.70[08]	550.43	3.90[08]	1.02[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	1.54[09]	1.54[09]	6.903	8.68[09]	1.73[08]	550.51	1.01[08]	2.65[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.30[09]	1.30[09]	6.898	4.80[09]	4.99[08]	550.65	3.42[08]	8.98[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	1.92[08]	1.92[08]	6.894	5.26[09]	1.48[09]	550.73	3.96[08]	1.04[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>1/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	1.74[10]	1.74[10]	6.860	2.56[09]	7.89[08]	551.13	7.61[08]	2.01[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	4.62[09]	4.62[09]	6.868	5.31[09]	5.09[08]	551.16	4.45[08]	1.17[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	1.74[10]	1.74[10]	6.860	2.56[09]	1.87[08]	551.21	1.80[08]	4.75[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	1.92[08]	1.92[08]	6.859	5.26[09]	1.17[09]	551.61	3.13[08]	8.24[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> G <sub>5/2</sub>	1.14[10]	1.14[10]	6.843	3.67[09]	3.39[08]	551.64	3.22[08]	8.50[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.30[09]	1.30[09]	6.844	4.80[09]	8.65[08]	551.75	5.92[08]	1.56[-15]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	1.06[13]	1.06[13]	1.069	1.06[10]	2.06[08]	552.66	2.06[08]	9.67[-16]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	4.45[12]	4.45[12]	0.926	2.01[10]	6.06[08]	555.37	6.06[08]	2.89[-15]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	4.70[12]	4.70[12]	0.953	2.90[10]	1.33[09]	555.54	1.33[09]	6.33[-15]
2s <sup>2</sup> 5f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2s2p6f	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	7.72[13]	7.88[13]	13.555	3.08[10]	2.85[08]	556.13	2.79[08]	3.77[-16]
2s <sup>2</sup> 5f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p6f	( <sup>1</sup> P) <sup>2</sup> G <sub>9/2</sub>	7.72[13]	7.88[13]	13.555	3.85[10]	3.69[08]	556.13	3.62[08]	4.88[-16]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.53[10]	4.53[10]	0.892	2.57[10]	1.93[08]	556.21	1.50[08]	7.20[-16]
2s2p3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	4.45[12]	4.45[12]	0.926	2.01[10]	2.82[08]	556.21	2.81[08]	1.34[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2.84[11]	2.84[11]	6.919	5.78[09]	2.73[08]	557.95	2.71[08]	7.11[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	1.70[11]	1.70[11]	6.912	8.19[09]	3.08[08]	558.14	3.06[08]	8.01[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	1.70[11]	1.70[11]	6.912	8.19[09]	4.42[08]	558.31	4.38[08]	1.15[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	1.54[09]	1.54[09]	6.903	8.68[09]	1.22[09]	558.53	7.17[08]	1.88[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.85[10]	1.85[10]	6.903	4.20[09]	1.08[08]	558.55	1.04[08]	2.73[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.30[09]	1.30[09]	6.898	4.80[09]	3.44[08]	558.67	2.36[08]	6.19[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	9.54[10]	9.54[10]	6.871	7.51[09]	1.08[09]	559.18	1.07[09]	2.81[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	2.35[09]	2.35[09]	6.862	6.98[09]	1.17[09]	559.56	8.50[08]	2.24[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> G <sub>5/2</sub>	1.14[10]	1.14[10]	6.843	3.67[09]	1.88[08]	559.88	1.79[08]	4.72[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.30[09]	1.30[09]	6.844	4.80[09]	1.71[08]	560.03	1.17[08]	3.09[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	1.70[11]	1.70[11]	6.912	8.19[09]	1.61[08]	560.42	1.60[08]	4.20[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	1.54[09]	1.54[09]	6.903	8.68[09]	7.68[08]	560.64	4.50[08]	1.18[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.85[10]	1.85[10]	6.903	4.20[09]	2.87[08]	560.66	2.76[08]	7.25[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	1.70[11]	1.70[11]	6.912	8.19[09]	2.17[08]	560.74	2.15[08]	5.65[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.30[09]	1.30[09]	6.898	4.80[09]	4.87[08]	560.79	3.33[08]	8.75[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	8.50[09]	8.50[09]	6.907	2.66[09]	5.48[08]	560.87	5.08[08]	1.33[-15]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{eH}$
Conf.	<i>LSJ</i>	Conf.	<i>LSJ</i>	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	$\text{\AA}$	$s^{-1}$	$\text{cm}^3/s$
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	<i>2s2p8f</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.85[10]	1.85[10]	6.903	4.20[09]	7.05[08]	560.98	6.79[08]	1.78[-15]
<i>2s<sup>2</sup>6h</i>	( <sup>1</sup> S) <sup>2</sup> H <sub>11/2</sub>	<i>2s2p7h</i>	( <sup>1</sup> P) <sup>2</sup> G <sub>9/2</sub>	1.75[11]	1.79[11]	16.240	3.18[10]	1.18[08]	561.04	1.13[08]	1.17[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>1/2</sub>	<i>2s2p8f</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	8.50[09]	8.50[09]	6.907	2.66[09]	4.16[08]	561.07	3.86[08]	1.01[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	<i>2s2p8f</i>	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	4.62[09]	4.62[09]	6.868	5.31[09]	7.00[08]	561.54	6.12[08]	1.61[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	<i>2s2p8f</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.30[09]	1.30[09]	6.844	4.80[09]	2.33[08]	562.16	1.59[08]	4.21[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	8.15[10]	8.15[10]	5.848	9.77[09]	3.53[08]	565.17	3.48[08]	1.02[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	5.26[11]	5.26[11]	5.858	7.80[09]	2.89[08]	565.30	2.88[08]	8.39[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	3.80[10]	3.80[10]	5.855	9.52[09]	1.45[08]	565.38	1.40[08]	4.09[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	4.89[10]	4.89[10]	5.825	8.97[09]	3.70[08]	565.49	3.59[08]	1.05[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	8.15[10]	8.15[10]	5.848	9.77[09]	3.73[08]	565.56	3.67[08]	1.07[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	1.38[08]	1.38[08]	5.845	8.72[09]	1.20[09]	565.64	1.64[08]	4.79[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	4.89[10]	4.89[10]	5.825	8.97[09]	2.11[08]	565.76	2.05[08]	6.00[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	9.53[09]	9.53[09]	5.813	3.91[09]	2.82[08]	565.81	2.55[08]	7.47[-16]
<i>2s<sup>2</sup>6f</i>	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	<i>2s2p8f</i>	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	3.41[13]	4.56[13]	16.254	2.61[10]	3.27[08]	565.81	2.45[08]	2.52[-16]
<i>2s<sup>2</sup>6f</i>	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	<i>2s2p8f</i>	( <sup>1</sup> P) <sup>2</sup> G <sub>9/2</sub>	3.41[13]	4.57[13]	16.254	3.26[10]	4.25[08]	565.81	3.17[08]	3.27[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.94[11]	1.94[11]	5.822	6.98[09]	1.35[08]	565.84	1.35[08]	3.94[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	8.15[10]	8.15[10]	5.814	9.77[09]	9.32[08]	566.07	9.18[08]	2.69[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	1.38[08]	1.38[08]	5.845	8.72[09]	1.22[09]	566.15	1.67[08]	4.87[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.94[11]	1.94[11]	5.822	6.98[09]	3.73[08]	566.23	3.71[08]	1.08[-15]
<i>2s2p3d</i>	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	<i>2s2p7f</i>	( <sup>1</sup> P) <sup>2</sup> G <sub>9/2</sub>	2.96[13]	1.87[14]	15.346	3.34[10]	1.77[09]	566.23	2.82[08]	3.18[-16]
<i>2s2p3d</i>	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	<i>2s2p7f</i>	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	2.96[13]	1.86[14]	15.346	2.68[10]	1.36[09]	566.23	2.16[08]	2.44[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> G <sub>5/2</sub>	4.32[09]	4.32[09]	5.794	5.58[09]	1.89[09]	566.31	1.55[09]	4.55[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	8.15[10]	8.15[10]	5.814	9.77[09]	1.46[08]	566.45	1.44[08]	4.21[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	7.04[10]	7.04[10]	5.796	7.07[09]	1.67[09]	566.53	1.65[09]	4.83[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> G <sub>9/2</sub>	5.38[10]	5.38[10]	5.809	8.58[09]	2.56[09]	566.56	2.52[09]	7.37[-15]
<i>2s2p3d</i>	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	<i>2s2p8p</i>	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	8.05[13]	1.28[14]	16.087	2.17[10]	1.76[08]	575.13	1.10[08]	1.16[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	4.66[09]	4.66[09]	5.865	3.88[09]	3.00[08]	576.71	2.48[08]	7.22[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.99[10]	1.99[10]	5.860	6.01[09]	1.11[08]	576.87	1.06[08]	3.08[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	4.66[09]	4.66[09]	5.865	3.88[09]	1.57[08]	576.87	1.30[08]	3.79[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.99[10]	1.99[10]	5.860	6.01[09]	7.21[08]	577.02	6.86[08]	2.00[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	3.80[10]	3.80[10]	5.855	9.52[09]	3.18[08]	577.14	3.08[08]	8.98[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.99[10]	1.99[10]	5.860	6.01[09]	1.32[08]	577.26	1.25[08]	3.65[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	5.26[11]	5.26[11]	5.858	7.80[09]	1.34[08]	577.30	1.33[08]	3.88[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	8.15[10]	8.15[10]	5.848	9.77[09]	4.53[08]	577.33	4.46[08]	1.30[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	3.80[10]	3.80[10]	5.855	9.52[09]	9.09[08]	577.38	8.82[08]	2.57[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	8.15[10]	8.15[10]	5.848	9.77[09]	2.31[08]	577.57	2.27[08]	6.62[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	1.38[08]	1.38[08]	5.845	8.72[09]	2.53[09]	577.65	3.45[08]	1.01[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	4.89[10]	4.89[10]	5.825	8.97[09]	2.15[08]	577.79	2.09[08]	6.11[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.94[11]	1.94[11]	5.822	6.98[09]	1.15[09]	578.03	1.14[09]	3.35[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>1/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	9.53[09]	9.53[09]	5.813	3.91[09]	1.34[09]	578.04	1.21[09]	3.55[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	9.53[09]	9.53[09]	5.813	3.91[09]	3.53[08]	578.13	3.20[08]	9.37[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> G <sub>9/2</sub>	5.38[10]	5.38[10]	5.809	8.58[09]	1.86[09]	578.61	1.83[09]	5.36[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> G <sub>5/2</sub>	4.32[09]	4.32[09]	5.794	5.58[09]	4.62[08]	578.64	3.80[08]	1.11[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	7.04[10]	7.04[10]	5.796	7.07[09]	1.32[09]	578.75	1.31[09]	3.83[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	<i>2s2p4f</i>	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	8.81[09]	8.81[09]	5.938	7.48[10]	4.88[08]	583.91	2.37[08]	6.84[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	3.44[11]	3.44[11]	5.888	5.80[09]	4.27[08]	585.10	4.26[08]	1.24[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2.65[11]	2.65[11]	5.875	1.04[10]	6.91[08]	585.67	6.86[08]	2.00[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.99[10]	1.99[10]	5.860	6.01[09]	1.32[08]	586.08	1.26[08]	3.66[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	3.80[10]	3.80[10]	5.855	9.52[09]	3.54[08]	586.20	3.43[08]	1.00[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	8.15[10]	8.15[10]	5.848	9.77[09]	1.55[09]	586.40	1.52[09]	4.45[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	<i>2s2p8f</i>	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	1.70[11]	1.70[11]	6.912	8.19[09]	1.07[08]	586.67	1.06[08]	2.77[-16]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	<i>2s2p7f</i>	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	4.89[10]	4.89[10]	5.825	8.97[09]	1.78[09]	586.85	1.73[09]	5.04[-15]
<i>2s2p3d</i>	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	<i>2s2p8f</i>	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	1.54[09]	1.54[09]	6.903	8.68[09]	4.28[08]	586.92	2.51[08]	6.58[-16]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_{S,S}^{\text{eff}}$
Conf.	$LSJ$	Conf.	$LSJ$	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	$\text{\AA}$	$s^{-1}$	$\text{cm}^3/s$
2s2p3d	$(^3P)^2D_{5/2}$	2s2p7f	$(^3P)^2F_{7/2}$	8.15[10]	8.15[10]	5.814	9.77[09]	2.10[09]	587.36	2.07[09]	6.06[-15]
2s2p3d	$(^3P)^2F_{7/2}$	2s2p8f	$(^3P)^2G_{9/2}$	4.90[09]	4.90[09]	6.905	6.80[09]	3.14[09]	587.70	2.76[09]	7.24[-15]
2s2p3d	$(^3P)^2D_{3/2}$	2s2p7f	$(^3P)^4G_{5/2}$	4.32[09]	4.32[09]	5.794	5.58[09]	2.49[08]	587.72	2.05[08]	6.01[-16]
2s2p3d	$(^3P)^2F_{7/2}$	2s2p8f	$(^3P)^2F_{7/2}$	1.54[09]	1.54[09]	6.903	8.68[09]	4.95[08]	587.75	2.90[08]	7.61[-16]
2s2p3d	$(^3P)^2F_{5/2}$	2s2p8f	$(^3P)^2F_{5/2}$	9.54[10]	9.54[10]	6.871	7.51[09]	1.99[08]	587.82	1.97[08]	5.18[-16]
2s2p3d	$(^3P)^2D_{5/2}$	2s2p7f	$(^3P)^4G_{7/2}$	7.04[10]	7.04[10]	5.796	7.07[09]	1.92[08]	587.86	1.89[08]	5.55[-16]
2s2p3d	$(^3P)^2F_{5/2}$	2s2p8f	$(^3P)^2G_{7/2}$	4.62[09]	4.62[09]	6.868	5.31[09]	1.29[09]	587.90	1.13[09]	2.96[-15]
2s2p3d	$(^3P)^4F_{5/2}$	2s2p7f	$(^3P)^2D_{5/2}$	2.65[11]	2.65[11]	5.875	1.04[10]	1.80[08]	587.99	1.78[08]	5.19[-16]
2s2p3d	$(^3P)^2F_{5/2}$	2s2p8f	$(^3P)^4G_{7/2}$	2.35[09]	2.35[09]	6.862	6.98[09]	4.67[08]	588.05	3.41[08]	8.97[-16]
2s2p3d	$(^3P)^4P_{3/2}$	2s2p7f	$(^3P)^2D_{5/2}$	2.65[11]	2.65[11]	5.875	1.04[10]	2.05[08]	588.34	2.04[08]	5.93[-16]
2s2p3d	$(^3P)^4F_{5/2}$	2s2p7f	$(^3P)^4D_{5/2}$	1.99[10]	1.99[10]	5.860	6.01[09]	5.80[08]	588.41	5.52[08]	1.61[-15]
2s2p3d	$(^3P)^4P_{5/2}$	2s2p7f	$(^3P)^4D_{7/2}$	3.80[10]	3.80[10]	5.855	9.52[09]	2.34[09]	588.54	2.27[09]	6.61[-15]
2s2p3d	$(^3P)^2F_{5/2}$	2s2p8f	$(^3P)^4F_{7/2}$	1.30[09]	1.30[09]	6.844	4.80[09]	4.43[08]	588.58	3.03[08]	8.01[-16]
2s2p3d	$(^3P)^4P_{3/2}$	2s2p7f	$(^3P)^4D_{3/2}$	4.66[09]	4.66[09]	5.865	3.88[09]	9.40[08]	588.60	7.78[08]	2.27[-15]
2s2p3d	$(^3P)^4P_{5/2}$	2s2p7f	$(^3P)^4D_{5/2}$	1.99[10]	1.99[10]	5.860	6.01[09]	1.40[09]	588.76	1.33[09]	3.87[-15]
2s2p3d	$(^3P)^4P_{1/2}$	2s2p7f	$(^3P)^4D_{3/2}$	4.66[09]	4.66[09]	5.865	3.88[09]	7.12[08]	588.82	5.89[08]	1.72[-15]
2s2p3d	$(^3P)^4P_{5/2}$	2s2p7f	$(^3P)^2G_{7/2}$	1.94[11]	1.94[11]	5.822	6.98[09]	9.94[08]	589.46	9.89[08]	2.89[-15]
2s <sup>2</sup> 4p	$(^1S)^2P_{1/2}$	2p <sup>2</sup> 3d	$(^1D)^2S_{1/2}$	1.03[14]	1.03[14]	5.805	9.73[09]	2.75[08]	589.55	2.75[08]	8.05[-16]
2s <sup>2</sup> 4p	$(^1S)^2P_{3/2}$	2p <sup>2</sup> 3d	$(^1D)^2S_{1/2}$	1.03[14]	1.03[14]	5.805	9.73[09]	5.54[08]	589.70	5.53[08]	1.62[-15]
2s2p3d	$(^3P)^4P_{5/2}$	2s2p7f	$(^3P)^4G_{7/2}$	7.04[10]	7.04[10]	5.796	7.07[09]	2.34[08]	590.20	2.31[08]	6.76[-16]
2s <sup>2</sup> 6f	$(^1S)^2F_{5/2}$	2s2p7f	$(^1P)^2G_{7/2}$	2.96[13]	1.86[14]	15.346	2.68[10]	8.65[08]	590.29	1.38[08]	1.55[-16]
2s <sup>2</sup> 6f	$(^1S)^2F_{7/2}$	2s2p7f	$(^1P)^2G_{9/2}$	2.96[13]	1.87[14]	15.346	3.34[10]	1.13[09]	590.29	1.79[08]	2.02[-16]
2s <sup>2</sup> 4p	$(^1S)^2P_{1/2}$	2s2p7p	$(^3P)^2S_{1/2}$	3.80[12]	3.80[12]	5.751	1.70[10]	1.20[08]	591.09	1.20[08]	3.52[-16]
2s <sup>2</sup> 4p	$(^1S)^2P_{3/2}$	2s2p7p	$(^3P)^2S_{1/2}$	3.80[12]	3.80[12]	5.751	1.70[10]	2.35[08]	591.24	2.34[08]	6.90[-16]
2s2p3d	$(^3P)^2F_{5/2}$	2s2p8p	$(^3P)^2D_{3/2}$	6.01[11]	6.01[11]	6.741	4.88[09]	4.94[08]	591.47	4.93[08]	1.31[-15]
2s2p3d	$(^3P)^2F_{7/2}$	2s2p8p	$(^3P)^2D_{5/2}$	6.40[11]	6.40[11]	6.769	6.52[09]	7.48[08]	591.51	7.46[08]	1.98[-15]
2s2p3d	$(^3P)^2P_{3/2}$	2s2p8f	$(^3P)^2D_{3/2}$	2.84[11]	2.84[11]	6.919	5.78[09]	2.18[08]	594.41	2.17[08]	5.69[-16]
2s2p3d	$(^3P)^2P_{3/2}$	2s2p8f	$(^3P)^2D_{5/2}$	1.70[11]	1.70[11]	6.912	8.19[09]	1.20[09]	594.62	1.19[09]	3.11[-15]
2s2p3d	$(^3P)^2P_{1/2}$	2s2p8f	$(^3P)^2D_{3/2}$	2.84[11]	2.84[11]	6.919	5.78[09]	1.05[09]	594.87	1.04[09]	2.73[-15]
2s2p3d	$(^3P)^2P_{3/2}$	2s2p8f	$(^3P)^4D_{5/2}$	1.85[10]	1.85[10]	6.903	4.20[09]	1.30[08]	594.89	1.25[08]	3.28[-16]
2s2p3d	$(^3P)^2P_{3/2}$	2s2p8f	$(^3P)^2F_{5/2}$	9.54[10]	9.54[10]	6.871	7.51[09]	6.69[08]	595.80	6.60[08]	1.74[-15]
2s2p3d	$(^3P)^2P_{3/2}$	2s2p8p	$(^3P)^2S_{1/2}$	1.59[13]	1.59[13]	6.856	2.76[09]	2.68[08]	596.22	2.68[08]	7.07[-16]
2s2p3d	$(^3P)^2P_{1/2}$	2s2p8p	$(^3P)^2S_{1/2}$	1.59[13]	1.59[13]	6.856	2.76[09]	1.59[08]	596.68	1.59[08]	4.19[-16]
2s2p3d	$(^3P)^2F_{5/2}$	2s2p4f	$(^1P)^2G_{7/2}$	1.63[14]	1.63[14]	6.257	5.55[10]	8.96[08]	605.42	8.96[08]	2.51[-15]
2s2p3d	$(^3P)^2F_{7/2}$	2s2p4f	$(^1P)^2G_{9/2}$	1.63[14]	1.63[14]	6.258	6.94[10]	1.25[09]	606.30	1.25[09]	3.49[-15]
2s2p3d	$(^1P)^2P_{1/2}$	2s2p7p	$(^1P)^2S_{1/2}$	8.21[13]	1.14[14]	14.897	1.15[10]	2.22[08]	608.68	1.60[08]	1.88[-16]
2s2p3d	$(^1P)^2P_{3/2}$	2s2p7p	$(^1P)^2S_{1/2}$	8.21[13]	1.14[14]	14.897	1.15[10]	4.67[08]	608.74	3.36[08]	3.96[-16]
2s <sup>2</sup> 4p	$(^1S)^2P_{1/2}$	2p <sup>2</sup> 3d	$(^1D)^2P_{1/2}$	6.58[09]	6.58[09]	5.140	5.02[10]	7.49[08]	608.83	1.56[08]	4.87[-16]
2s2p3d	$(^1P)^2P_{3/2}$	2s2p7p	$(^1P)^2D_{5/2}$	4.48[12]	1.60[13]	14.869	2.14[10]	5.61[08]	609.56	1.57[08]	1.86[-16]
2s2p3d	$(^3P)^4F_{7/2}$	2s2p6f	$(^3P)^2G_{9/2}$	3.91[11]	3.91[11]	4.247	1.16[10]	3.05[08]	610.12	3.04[08]	1.04[-15]
2s2p3d	$(^3P)^4F_{7/2}$	2s2p6f	$(^3P)^4F_{9/2}$	7.84[09]	7.84[09]	4.232	1.49[10]	1.40[09]	610.58	1.18[09]	4.03[-15]
2s2p3d	$(^3P)^4F_{3/2}$	2s2p6f	$(^3P)^4F_{3/2}$	6.96[09]	6.96[09]	4.206	6.43[09]	6.33[08]	610.59	5.14[08]	1.77[-15]
2s2p3d	$(^3P)^4F_{5/2}$	2s2p6f	$(^3P)^2G_{7/2}$	3.68[11]	3.68[11]	4.216	1.11[10]	5.00[08]	610.61	4.98[08]	1.71[-15]
2s2p3d	$(^3P)^4F_{5/2}$	2s2p6f	$(^3P)^4F_{7/2}$	1.03[09]	1.03[09]	4.215	1.28[10]	6.10[08]	610.65	2.39[08]	8.22[-16]
2s2p3d	$(^3P)^4F_{5/2}$	2s2p6f	$(^3P)^4F_{5/2}$	4.29[09]	4.29[09]	4.209	9.58[09]	1.18[09]	610.80	8.63[08]	2.97[-15]
2s2p3d	$(^3P)^4F_{5/2}$	2s2p6f	$(^3P)^4F_{3/2}$	6.96[09]	6.96[09]	4.206	6.43[09]	1.71[08]	610.91	1.39[08]	4.78[-16]
2s2p3d	$(^3P)^4F_{7/2}$	2s2p6f	$(^3P)^4F_{7/2}$	1.03[09]	1.03[09]	4.215	1.28[10]	1.58[09]	611.10	6.22[08]	2.13[-15]
2s2p3d	$(^3P)^4F_{9/2}$	2s2p6f	$(^3P)^4F_{9/2}$	7.84[09]	7.84[09]	4.232	1.49[10]	2.63[09]	611.18	2.21[09]	7.57[-15]
2s2p3d	$(^3P)^4F_{7/2}$	2s2p6f	$(^3P)^4F_{5/2}$	4.29[09]	4.29[09]	4.209	9.58[09]	2.43[08]	611.25	1.77[08]	6.09[-16]
2s2p3d	$(^3P)^4F_{3/2}$	2s2p6f	$(^3P)^4G_{5/2}$	7.69[08]	7.69[08]	4.178	8.46[09]	4.17[09]	611.42	1.47[09]	5.07[-15]
2s2p3d	$(^3P)^4F_{5/2}$	2s2p6f	$(^3P)^4G_{7/2}$	4.60[10]	4.60[10]	4.182	1.10[10]	4.67[09]	611.63	4.53[09]	1.56[-14]
2s2p3s	$(^1P)^2P_{1/2}$	2s2p8f	$(^3P)^2D_{3/2}$	2.84[11]	2.84[11]	6.919	5.78[09]	3.19[08]	611.70	3.18[08]	8.32[-16]
2s2p3d	$(^3P)^4F_{7/2}$	2s2p6f	$(^3P)^4G_{9/2}$	4.38[10]	4.38[10]	4.194	1.39[10]	5.86[09]	611.71	5.68[09]	1.95[-14]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{\text{eff}}$
Conf.	<i>LSJ</i>	Conf.	<i>LSJ</i>	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	Å	$s^{-1}$	$\text{cm}^3/\text{s}$
$2s2p3s$	$(^1P) ^2P_{3/2}$	$2s2p8f$	$(^3P) ^2D_{5/2}$	1.70[11]	1.70[11]	6.912	8.19[09]	3.43[08]	611.89	3.40[08]	8.92[-16]
$2s2p3s$	$(^1P) ^2P_{3/2}$	$2s2p8f$	$(^3P) ^2F_{5/2}$	9.54[10]	9.54[10]	6.871	7.51[09]	1.96[08]	613.14	1.93[08]	5.08[-16]
$2s2p3d$	$(^1P) ^2F_{7/2}$	$2s2p6f$	$(^1P) ^2G_{9/2}$	7.72[13]	7.88[13]	13.555	3.85[10]	1.45[08]	616.67	1.42[08]	1.92[-16]
$2s2p3d$	$(^1P) ^2F_{5/2}$	$2s2p6f$	$(^1P) ^2G_{7/2}$	7.72[13]	7.88[13]	13.555	3.08[10]	1.12[08]	616.67	1.10[08]	1.48[-16]
$2s2p3d$	$(^3P) ^2F_{5/2}$	$2s2p7f$	$(^3P) ^4D_{7/2}$	3.80[10]	3.80[10]	5.855	9.52[09]	1.33[08]	617.56	1.29[08]	3.77[-16]
$2s2p3d$	$(^3P) ^2F_{5/2}$	$2s2p7f$	$(^3P) ^2F_{7/2}$	8.15[10]	8.15[10]	5.848	9.77[09]	4.97[08]	617.77	4.89[08]	1.43[-15]
$2s2p3d$	$(^3P) ^2F_{7/2}$	$2s2p7f$	$(^3P) ^2G_{9/2}$	5.26[11]	5.26[11]	5.858	7.80[09]	3.19[09]	618.39	3.19[09]	9.28[-15]
$2s2p3d$	$(^3P) ^2F_{5/2}$	$2s2p7f$	$(^3P) ^2F_{5/2}$	4.89[10]	4.89[10]	5.825	8.97[09]	3.05[08]	618.48	2.96[08]	8.64[-16]
$2s2p3d$	$(^3P) ^2F_{7/2}$	$2s2p7f$	$(^3P) ^4D_{7/2}$	3.80[10]	3.80[10]	5.855	9.52[09]	2.02[08]	618.48	1.96[08]	5.70[-16]
$2s2p3d$	$(^3P) ^2F_{5/2}$	$2s2p7f$	$(^3P) ^2G_{7/2}$	1.94[11]	1.94[11]	5.822	6.98[09]	1.07[09]	618.57	1.06[09]	3.10[-15]
$2s2p3d$	$(^3P) ^2F_{7/2}$	$2s2p7f$	$(^3P) ^2F_{7/2}$	8.15[10]	8.15[10]	5.848	9.77[09]	4.72[08]	618.70	4.65[08]	1.36[-15]
$2s2p3d$	$(^3P) ^2F_{5/2}$	$2s2p7f$	$(^3P) ^2F_{7/2}$	8.15[10]	8.15[10]	5.814	9.77[09]	6.45[08]	618.84	6.35[08]	1.86[-15]
$2s2p3d$	$(^3P) ^2F_{5/2}$	$2s2p7f$	$(^3P) ^4G_{7/2}$	7.04[10]	7.04[10]	5.796	7.07[09]	4.07[08]	619.39	4.02[08]	1.18[-15]
$2s2p3d$	$(^3P) ^2F_{7/2}$	$2s2p7f$	$(^3P) ^2F_{7/2}$	8.15[10]	8.15[10]	5.814	9.77[09]	2.45[08]	619.77	2.41[08]	7.06[-16]
$2s2p3d$	$(^3P) ^2F_{7/2}$	$2s2p7f$	$(^3P) ^4G_{9/2}$	5.38[10]	5.38[10]	5.809	8.58[09]	3.04[08]	619.90	2.99[08]	8.77[-16]
$2s2p3d$	$(^3P) ^2F_{5/2}$	$2s2p4f$	$(^1P) ^2D_{3/2}$	1.30[11]	1.30[11]	5.756	3.25[10]	1.42[08]	620.61	1.33[08]	3.92[-16]
$2s2p3d$	$(^3P) ^2F_{7/2}$	$2s2p4f$	$(^1P) ^2D_{5/2}$	1.43[11]	1.43[11]	5.756	4.82[10]	2.30[08]	621.55	2.18[08]	6.42[-16]
$2s^24f$	$(^1S) ^2F_{5/2}$	$2s2p4f$	$(^1P) ^2G_{7/2}$	1.63[14]	1.63[14]	6.257	5.55[10]	1.28[10]	622.13	1.28[10]	3.59[-14]
$2s^24f$	$(^1S) ^2F_{7/2}$	$2s2p4f$	$(^1P) ^2G_{9/2}$	1.63[14]	1.63[14]	6.258	6.94[10]	1.65[10]	622.15	1.65[10]	4.62[-14]
$2s^24f$	$(^1S) ^2F_{7/2}$	$2s2p4f$	$(^1P) ^2G_{7/2}$	1.63[14]	1.63[14]	6.257	5.55[10]	4.58[08]	622.16	4.58[08]	1.28[-15]
$2s2p3d$	$(^3P) ^4D_{3/2}$	$2s2p6f$	$(^3P) ^4D_{3/2}$	1.38[09]	1.38[09]	4.269	6.30[09]	4.64[08]	622.97	2.16[08]	7.39[-16]
$2s2p3d$	$(^3P) ^4D_{5/2}$	$2s2p6f$	$(^3P) ^4D_{3/2}$	1.38[09]	1.38[09]	4.269	6.30[09]	2.69[08]	623.15	1.26[08]	4.30[-16]
$2s2p3d$	$(^3P) ^4D_{5/2}$	$2s2p6f$	$(^3P) ^4D_{5/2}$	2.69[09]	2.69[09]	4.262	9.55[09]	1.17[09]	623.36	7.33[08]	2.50[-15]
$2s2p3d$	$(^3P) ^4D_{7/2}$	$2s2p6f$	$(^3P) ^4D_{5/2}$	2.69[09]	2.69[09]	4.262	9.55[09]	2.46[08]	623.64	1.54[08]	5.28[-16]
$2s2p3d$	$(^3P) ^4D_{7/2}$	$2s2p6f$	$(^3P) ^4D_{7/2}$	3.00[08]	3.00[08]	4.252	1.32[10]	2.10[09]	623.97	3.23[08]	1.10[-15]
$2s2p3d$	$(^3P) ^4D_{7/2}$	$2s2p6f$	$(^3P) ^2G_{9/2}$	3.91[11]	3.91[11]	4.247	1.16[10]	4.74[08]	624.12	4.73[08]	1.62[-15]
$2s2p3d$	$(^3P) ^2F_{5/2}$	$2s2p7p$	$(^3P) ^2D_{3/2}$	8.67[11]	8.67[11]	5.630	1.23[10]	2.57[08]	624.57	2.56[08]	7.62[-16]
$2s2p3d$	$(^3P) ^2F_{7/2}$	$2s2p7p$	$(^3P) ^2D_{5/2}$	8.74[11]	8.74[11]	5.659	1.81[10]	3.70[08]	624.59	3.69[08]	1.10[-15]
$2s2p3d$	$(^3P) ^4D_{7/2}$	$2s2p6f$	$(^3P) ^4F_{9/2}$	7.84[09]	7.84[09]	4.232	1.49[10]	5.57[09]	624.60	4.68[09]	1.60[-14]
$2s2p3d$	$(^3P) ^4D_{3/2}$	$2s2p6f$	$(^3P) ^4F_{5/2}$	4.29[09]	4.29[09]	4.209	9.58[09]	3.50[09]	624.84	2.55[09]	8.75[-15]
$2s2p3d$	$(^3P) ^4D_{1/2}$	$2s2p6f$	$(^3P) ^4F_{3/2}$	6.96[09]	6.96[09]	4.206	6.43[09]	2.52[09]	624.86	2.05[09]	7.04[-15]
$2s2p3d$	$(^3P) ^4D_{5/2}$	$2s2p6f$	$(^3P) ^4F_{7/2}$	1.03[09]	1.03[09]	4.215	1.28[10]	3.94[09]	624.86	1.55[09]	5.31[-15]
$2s2p3d$	$(^3P) ^4D_{3/2}$	$2s2p6f$	$(^3P) ^4F_{3/2}$	6.96[09]	6.96[09]	4.206	6.43[09]	7.42[08]	624.96	6.03[08]	2.07[-15]
$2s2p3d$	$(^3P) ^4D_{5/2}$	$2s2p6f$	$(^3P) ^4F_{5/2}$	4.29[09]	4.29[09]	4.209	9.58[09]	5.40[08]	625.02	3.94[08]	1.35[-15]
$2s2p3d$	$(^3P) ^2P_{3/2}$	$2s2p7f$	$(^3P) ^2D_{3/2}$	3.44[11]	3.44[11]	5.888	5.80[09]	2.70[08]	625.31	2.69[08]	7.82[-16]
$2s2p3d$	$(^3P) ^2P_{3/2}$	$2s2p7f$	$(^3P) ^2D_{5/2}$	2.65[11]	2.65[11]	5.875	1.04[10]	1.89[09]	625.75	1.87[09]	5.45[-15]
$2s2p3d$	$(^3P) ^4D_{7/2}$	$2s2p6f$	$(^3P) ^4G_{9/2}$	4.38[10]	4.38[10]	4.194	1.39[10]	2.34[09]	625.78	2.27[09]	7.79[-15]
$2s2p3d$	$(^3P) ^2P_{1/2}$	$2s2p7f$	$(^3P) ^2D_{3/2}$	3.44[11]	3.44[11]	5.888	5.80[09]	1.30[09]	625.82	1.29[09]	3.75[-15]
$2s2p3d$	$(^3P) ^4D_{3/2}$	$2s2p6f$	$(^3P) ^4G_{5/2}$	7.69[08]	7.69[08]	4.178	8.46[09]	5.12[08]	625.83	1.81[08]	6.23[-16]
$2s2p3d$	$(^3P) ^4D_{5/2}$	$2s2p6f$	$(^3P) ^4G_{7/2}$	4.60[10]	4.60[10]	4.182	1.10[10]	1.44[09]	625.90	1.40[09]	4.81[-15]
$2s2p3d$	$(^3P) ^2P_{3/2}$	$2s2p7f$	$(^3P) ^4D_{5/2}$	1.99[10]	1.99[10]	5.860	6.01[09]	1.42[08]	626.22	1.35[08]	3.94[-16]
$2s2p3d$	$(^3P) ^2P_{3/2}$	$2s2p7f$	$(^3P) ^2F_{5/2}$	4.89[10]	4.89[10]	5.825	8.97[09]	3.65[08]	627.31	3.54[08]	1.03[-15]
$2s^26p$	$(^1S) ^2P_{1/2}$	$2s2p6p$	$(^1P) ^2S_{1/2}$	1.35[14]	2.00[14]	13.152	1.18[10]	1.14[09]	629.61	7.70[08]	1.08[-15]
$2s2p3d$	$(^3P) ^2P_{3/2}$	$2s2p7p$	$(^3P) ^2S_{1/2}$	3.80[12]	3.80[12]	5.751	1.70[10]	4.63[08]	629.69	4.62[08]	1.36[-15]
$2s^26p$	$(^1S) ^2P_{3/2}$	$2s2p6p$	$(^1P) ^2S_{1/2}$	1.35[14]	2.00[14]	13.152	1.18[10]	2.72[09]	630.03	1.84[09]	2.58[-15]
$2s2p3d$	$(^3P) ^2P_{1/2}$	$2s2p7p$	$(^3P) ^2S_{1/2}$	3.80[12]	3.80[12]	5.751	1.70[10]	2.59[08]	630.21	2.58[08]	7.60[-16]
$2s^25f$	$(^1S) ^2F_{5/2}$	$2s2p5f$	$(^1P) ^2G_{7/2}$	1.31[14]	1.39[14]	10.922	3.97[10]	1.16[10]	630.58	1.10[10]	1.93[-14]
$2s^25f$	$(^1S) ^2F_{7/2}$	$2s2p5f$	$(^1P) ^2G_{9/2}$	1.31[14]	1.39[14]	10.923	4.97[10]	1.50[10]	630.58	1.42[10]	2.50[-14]
$2s^25f$	$(^1S) ^2F_{7/2}$	$2s2p5f$	$(^1P) ^2G_{7/2}$	1.31[14]	1.39[14]	10.922	3.97[10]	4.26[08]	630.58	4.04[08]	7.09[-16]
$2s^24p$	$(^1S) ^2P_{1/2}$	$2s2p4p$	$(^1P) ^2D_{3/2}$	3.20[11]	3.20[11]	4.412	6.03[10]	5.70[09]	631.38	5.44[09]	1.83[-14]
$2s^25p$	$(^1S) ^2P_{1/2}$	$2s2p5p$	$(^1P) ^2S_{1/2}$	2.11[14]	2.11[14]	10.210	1.19[10]	1.99[09]	631.40	1.99[09]	3.75[-15]
$2s^24p$	$(^1S) ^2P_{3/2}$	$2s2p4p$	$(^1P) ^2D_{5/2}$	3.58[11]	3.58[11]	4.416	9.16[10]	1.03[10]	631.44	9.88[09]	3.32[-14]
$2s2p4d$	$(^3P) ^2F_{5/2}$	$2s2p8f$	$(^1P) ^2G_{7/2}$	3.41[13]	4.56[13]	16.254	2.61[10]	1.22[09]	631.46	9.08[08]	9.36[-16]

Low level		Upper level		$A_\alpha$	$\Sigma A_\alpha$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{\text{CH}}$
Conf.	LSJ	Conf.	LSJ	$\text{s}^{-1}$	$\text{s}^{-1}$	eV	$\text{s}^{-1}$	$\text{s}^{-1}$	$\text{\AA}$	$\text{s}^{-1}$	$\text{cm}^3/\text{s}$
$2s^25p$	$(^1S) ^2P_{3/2}$	$2s2p5p$	$(^1P) ^2S_{1/2}$	2.11[14]	2.11[14]	10.210	1.19[10]	3.98[09]	631.47	3.97[09]	7.49[-15]
$2s^24p$	$(^1S) ^2P_{3/2}$	$2s2p4p$	$(^1P) ^2D_{3/2}$	3.20[11]	3.20[11]	4.412	6.03[10]	1.15[09]	631.55	1.10[09]	3.69[-15]
$2s^26p$	$(^1S) ^2P_{3/2}$	$2s2p6p$	$(^1P) ^2D_{5/2}$	1.86[12]	8.06[13]	13.103	6.10[10]	7.64[09]	631.59	1.76[08]	2.49[-16]
$2s2p3d$	$(^3P) ^2D_{3/2}$	$2s2p6f$	$(^3P) ^2D_{3/2}$	6.82[11]	6.82[11]	4.328	1.43[10]	9.98[08]	631.60	9.93[08]	3.37[-15]
$2s2p3d$	$(^3P) ^2D_{3/2}$	$2s2p6f$	$(^3P) ^2D_{5/2}$	3.02[11]	3.02[11]	4.328	3.70[10]	2.76[09]	631.62	2.70[09]	9.18[-15]
$2s2p3d$	$(^3P) ^2D_{5/2}$	$2s2p6f$	$(^3P) ^2D_{3/2}$	6.82[11]	6.82[11]	4.328	1.43[10]	1.08[08]	631.81	1.08[08]	3.66[-16]
$2s2p3d$	$(^3P) ^2D_{5/2}$	$2s2p6f$	$(^3P) ^2D_{5/2}$	3.02[11]	3.02[11]	4.328	3.70[10]	1.88[09]	631.84	1.84[09]	6.24[-15]
$2s2p3d$	$(^3P) ^2D_{5/2}$	$2s2p6f$	$(^3P) ^2F_{7/2}$	2.07[10]	2.07[10]	4.319	6.67[10]	1.01[10]	632.13	7.21[09]	2.45[-14]
$2s^24f$	$(^1S) ^2F_{5/2}$	$2s2p4f$	$(^1P) ^2F_{7/2}$	8.81[09]	8.81[09]	5.938	7.48[10]	6.53[08]	632.26	3.17[08]	9.15[-16]
$2s^24f$	$(^1S) ^2F_{5/2}$	$2s2p4f$	$(^1P) ^2F_{5/2}$	4.16[09]	4.16[09]	5.938	5.62[10]	1.41[10]	632.27	4.32[09]	1.25[-14]
$2s^24f$	$(^1S) ^2F_{7/2}$	$2s2p4f$	$(^1P) ^2F_{7/2}$	8.81[09]	8.81[09]	5.938	7.48[10]	1.91[10]	632.29	9.26[09]	2.68[-14]
$2s2p4d$	$(^3P) ^2F_{7/2}$	$2s2p8f$	$(^1P) ^2G_{9/2}$	3.41[13]	4.57[13]	16.254	3.26[10]	2.22[09]	632.30	1.65[09]	1.70[-15]
$2s^24f$	$(^1S) ^2F_{7/2}$	$2s2p4f$	$(^1P) ^2F_{5/2}$	4.16[09]	4.16[09]	5.938	5.62[10]	7.88[08]	632.30	2.42[08]	7.00[-16]
$2s2p3d$	$(^3P) ^2P_{3/2}$	$2s2p7p$	$(^3P) ^2D_{5/2}$	8.74[11]	8.74[11]	5.659	1.81[10]	1.19[08]	632.63	1.19[08]	3.54[-16]
$2s2p3d$	$(^3P) ^2D_{3/2}$	$2s2p6f$	$(^3P) ^2D_{5/2}$	3.02[11]	3.02[11]	4.291	3.70[10]	5.04[09]	632.79	4.94[09]	1.68[-14]
$2s2p3d$	$(^3P) ^2D_{5/2}$	$2s2p6f$	$(^3P) ^2D_{5/2}$	3.02[11]	3.02[11]	4.291	3.70[10]	1.20[08]	633.01	1.18[08]	4.01[-16]
$2s^27f$	$(^1S) ^2F_{5/2}$	$2s2p7f$	$(^1P) ^2G_{7/2}$	2.96[13]	1.86[14]	15.346	2.68[10]	1.30[10]	633.23	2.07[09]	2.34[-15]
$2s^27f$	$(^1S) ^2F_{7/2}$	$2s2p7f$	$(^1P) ^2G_{9/2}$	2.96[13]	1.87[14]	15.346	3.34[10]	1.68[10]	633.23	2.67[09]	3.01[-15]
$2s^24f$	$(^1S) ^2F_{5/2}$	$2s2p7f$	$(^3P) ^2D_{3/2}$	3.44[11]	3.44[11]	5.888	5.80[09]	1.06[08]	633.87	1.06[08]	3.07[-16]
$2s^24p$	$(^1S) ^2P_{1/2}$	$2s2p6f$	$(^3P) ^2D_{3/2}$	6.82[11]	6.82[11]	4.328	1.43[10]	5.03[08]	634.09	5.00[08]	1.70[-15]
$2s^24p$	$(^1S) ^2P_{1/2}$	$2s2p4p$	$(^1P) ^2S_{1/2}$	1.54[14]	1.54[14]	4.325	9.31[09]	7.90[08]	634.19	7.90[08]	2.68[-15]
$2s^24p$	$(^1S) ^2P_{3/2}$	$2s2p6f$	$(^3P) ^2D_{5/2}$	3.02[11]	3.02[11]	4.328	3.70[10]	5.50[08]	634.29	5.39[08]	1.83[-15]
$2s^24f$	$(^1S) ^2F_{5/2}$	$2s2p7f$	$(^3P) ^2D_{5/2}$	2.65[11]	2.65[11]	5.875	1.04[10]	1.04[09]	634.32	1.03[09]	2.99[-15]
$2s^24p$	$(^1S) ^2P_{3/2}$	$2s2p4p$	$(^1P) ^2S_{1/2}$	1.54[14]	1.54[14]	4.325	9.31[09]	1.73[09]	634.36	1.73[09]	5.89[-15]
$2s2p3d$	$(^3P) ^4P_{5/2}$	$2s2p6f$	$(^3P) ^2D_{5/2}$	3.02[11]	3.02[11]	4.328	3.70[10]	1.04[08]	634.55	1.02[08]	3.46[-16]
$2s2p3d$	$(^3P) ^4P_{5/2}$	$2s2p6f$	$(^3P) ^2F_{7/2}$	2.07[10]	2.07[10]	4.319	6.67[10]	6.04[08]	634.84	4.31[08]	1.46[-15]
$2s^24f$	$(^1S) ^2F_{7/2}$	$2s2p7f$	$(^3P) ^2G_{9/2}$	5.26[11]	5.26[11]	5.858	7.80[09]	1.29[08]	634.89	1.29[08]	3.75[-16]
$2s^24f$	$(^1S) ^2F_{7/2}$	$2s2p7f$	$(^3P) ^4D_{7/2}$	3.80[10]	3.80[10]	5.855	9.52[09]	7.90[08]	634.98	7.66[08]	2.23[-15]
$2s^24f$	$(^1S) ^2F_{5/2}$	$2s2p7f$	$(^3P) ^2F_{7/2}$	8.15[10]	8.15[10]	5.848	9.77[09]	1.56[08]	635.18	1.54[08]	4.48[-16]
$2s^24f$	$(^1S) ^2F_{7/2}$	$2s2p7f$	$(^3P) ^2F_{7/2}$	8.15[10]	8.15[10]	5.848	9.77[09]	1.45[09]	635.21	1.43[09]	4.18[-15]
$2s2p3d$	$(^3P) ^2D_{5/2}$	$2s2p6f$	$(^3P) ^2G_{7/2}$	3.68[11]	3.68[11]	4.216	1.11[10]	2.98[08]	635.46	2.97[08]	1.02[-15]
$2s^24p$	$(^1S) ^2P_{3/2}$	$2s2p6f$	$(^3P) ^2D_{5/2}$	3.02[11]	3.02[11]	4.291	3.70[10]	2.25[08]	635.47	2.21[08]	7.52[-16]
$2s^25p$	$(^1S) ^2P_{1/2}$	$2s2p5p$	$(^1P) ^2D_{3/2}$	2.04[12]	2.04[12]	10.077	1.96[10]	7.41[09]	635.71	7.40[09]	1.41[-14]
$2s^25p$	$(^1S) ^2P_{3/2}$	$2s2p5p$	$(^1P) ^2D_{5/2}$	2.06[12]	2.06[12]	10.077	2.93[10]	1.33[10]	635.76	1.33[10]	2.54[-14]
$2s^25p$	$(^1S) ^2P_{3/2}$	$2s2p5p$	$(^1P) ^2D_{3/2}$	2.04[12]	2.04[12]	10.077	1.96[10]	1.45[09]	635.77	1.45[09]	2.77[-15]
$2s^24f$	$(^1S) ^2F_{5/2}$	$2s2p7f$	$(^3P) ^2F_{5/2}$	4.89[10]	4.89[10]	5.825	8.97[09]	8.81[08]	635.92	8.55[08]	2.50[-15]
$2s^24f$	$(^1S) ^2F_{7/2}$	$2s2p7f$	$(^3P) ^2F_{5/2}$	4.89[10]	4.89[10]	5.825	8.97[09]	2.71[08]	635.96	2.63[08]	7.68[-16]
$2s^28p$	$(^1S) ^2P_{1/2}$	$2s2p8p$	$(^1P) ^2S_{1/2}$	8.05[13]	1.28[14]	16.087	2.17[10]	2.21[09]	636.10	1.39[09]	1.46[-15]
$2s^28p$	$(^1S) ^2P_{3/2}$	$2s2p8p$	$(^1P) ^2S_{1/2}$	8.05[13]	1.28[14]	16.087	2.17[10]	4.48[09]	636.12	2.82[09]	2.96[-15]
$2s^24f$	$(^1S) ^2F_{7/2}$	$2s2p7f$	$(^3P) ^2F_{7/2}$	8.15[10]	8.15[10]	5.814	9.77[09]	1.03[09]	636.34	1.01[09]	2.96[-15]
$2s2p3d$	$(^3P) ^4P_{5/2}$	$2s2p6f$	$(^3P) ^4D_{5/2}$	2.69[09]	2.69[09]	4.262	9.55[09]	1.38[09]	636.67	8.67[08]	2.96[-15]
$2s2p3d$	$(^3P) ^4P_{3/2}$	$2s2p6f$	$(^3P) ^4D_{3/2}$	1.38[09]	1.38[09]	4.269	6.30[09]	1.80[09]	636.87	8.42[08]	2.88[-15]
$2s2p3d$	$(^3P) ^4P_{5/2}$	$2s2p6f$	$(^3P) ^4D_{7/2}$	3.00[08]	3.00[08]	4.252	1.32[10]	4.77[09]	637.02	7.34[08]	2.51[-15]
$2s2p3d$	$(^3P) ^4P_{3/2}$	$2s2p6f$	$(^3P) ^4D_{5/2}$	2.69[09]	2.69[09]	4.262	9.55[09]	3.13[09]	637.08	1.97[09]	6.73[-15]
$2s2p3d$	$(^3P) ^4P_{1/2}$	$2s2p6f$	$(^3P) ^4D_{3/2}$	1.38[09]	1.38[09]	4.269	6.30[09]	1.36[09]	637.13	6.36[08]	2.17[-15]
$2s^26h$	$(^1S) ^2H_{9/2}$	$2s2p6h$	$(^1P) ^2G_{7/2}$	4.99[10]	5.09[10]	13.596	2.59[10]	2.25[10]	637.30	2.07[10]	2.79[-14]
$2s^26h$	$(^1S) ^2H_{11/2}$	$2s2p6h$	$(^1P) ^2G_{9/2}$	4.99[10]	5.09[10]	13.596	3.23[10]	2.76[10]	637.30	2.54[10]	3.42[-14]
$2s^26h$	$(^1S) ^2H_{9/2}$	$2s2p6h$	$(^1P) ^2G_{9/2}$	4.99[10]	5.09[10]	13.596	3.23[10]	5.11[08]	637.30	4.71[08]	6.33[-16]
$2s^27h$	$(^1S) ^2H_{9/2}$	$2s2p7h$	$(^1P) ^2G_{7/2}$	1.12[11]	1.14[11]	15.200	2.52[10]	2.30[10]	637.34	2.21[10]	2.52[-14]
$2s^27h$	$(^1S) ^2H_{11/2}$	$2s2p7h$	$(^1P) ^2G_{9/2}$	1.12[11]	1.14[11]	15.200	3.15[10]	2.82[10]	637.34	2.71[10]	3.10[-14]
$2s^27h$	$(^1S) ^2H_{9/2}$	$2s2p7h$	$(^1P) ^2G_{9/2}$	1.12[11]	1.14[11]	15.200	3.15[10]	5.23[08]	637.34	5.01[08]	5.74[-16]
$2s^28h$	$(^1S) ^2H_{9/2}$	$2s2p7h$	$(^1P) ^2G_{7/2}$	1.76[11]	1.79[11]	16.240	2.55[10]	2.38[10]	637.38	2.30[10]	2.37[-14]

Low level		Upper level		A <sub>a</sub>	ΣA <sub>a</sub>	E <sub>S</sub>	ΣgA <sub>r</sub>	gA <sub>r</sub>	λ	Q <sub>d</sub>	C <sub>S</sub> <sup>eff</sup>
Conf.	LSJ	Conf.	LSJ	s <sup>-1</sup>	s <sup>-1</sup>	eV	s <sup>-1</sup>	s <sup>-1</sup>	Å	s <sup>-1</sup>	cm <sup>3</sup> /s
2s <sup>2</sup> 8h	( <sup>1</sup> S) <sup>2</sup> H <sub>11/2</sub>	2s2p7h	( <sup>1</sup> P) <sup>2</sup> G <sub>9/2</sub>	1.75[11]	1.79[11]	16.240	3.18[10]	2.92[10]	637.38	2.82[10]	2.91[-14]
2s <sup>2</sup> 8h	( <sup>1</sup> S) <sup>2</sup> H <sub>9/2</sub>	2s2p7h	( <sup>1</sup> P) <sup>2</sup> G <sub>9/2</sub>	1.75[11]	1.79[11]	16.240	3.18[10]	5.41[08]	637.38	5.22[08]	5.39[-16]
2s <sup>2</sup> 8k	( <sup>1</sup> S) <sup>2</sup> K <sub>15/2</sub>	2s2p7k	( <sup>1</sup> P) <sup>2</sup> I <sub>13/2</sub>	1.16[09]	1.17[09]	16.241	4.32[10]	4.14[10]	637.41	1.13[10]	1.17[-14]
2s <sup>2</sup> 8k	( <sup>1</sup> S) <sup>2</sup> K <sub>13/2</sub>	2s2p7k	( <sup>1</sup> P) <sup>2</sup> I <sub>11/2</sub>	1.16[09]	1.17[09]	16.241	3.70[10]	3.59[10]	637.41	9.79[09]	1.01[-14]
2s <sup>2</sup> 8k	( <sup>1</sup> S) <sup>2</sup> K <sub>13/2</sub>	2s2p7k	( <sup>1</sup> P) <sup>2</sup> I <sub>13/2</sub>	1.16[09]	1.17[09]	16.241	4.32[10]	3.98[08]	637.41	1.09[08]	1.12[-16]
2s <sup>2</sup> 8k	( <sup>1</sup> S) <sup>2</sup> K <sub>13/2</sub>	2s2p7k	( <sup>1</sup> P) <sup>2</sup> L <sub>15/2</sub>	2.70[11]	2.70[11]	16.241	4.27[10]	4.09[10]	637.43	4.04[10]	4.17[-14]
2s <sup>2</sup> 8k	( <sup>1</sup> S) <sup>2</sup> K <sub>15/2</sub>	2s2p7k	( <sup>1</sup> P) <sup>2</sup> L <sub>17/2</sub>	2.70[11]	2.70[11]	16.241	4.81[10]	4.64[10]	637.43	4.58[10]	4.73[-14]
2s <sup>2</sup> 8k	( <sup>1</sup> S) <sup>2</sup> K <sub>15/2</sub>	2s2p7k	( <sup>1</sup> P) <sup>2</sup> L <sub>15/2</sub>	2.70[11]	2.70[11]	16.241	4.27[10]	3.44[08]	637.43	3.39[08]	3.50[-16]
2s <sup>2</sup> 6h	( <sup>1</sup> S) <sup>2</sup> H <sub>9/2</sub>	2s2p6h	( <sup>1</sup> P) <sup>2</sup> I <sub>11/2</sub>	8.00[12]	8.07[12]	13.591	3.77[10]	3.20[10]	637.45	3.17[10]	4.26[-14]
2s <sup>2</sup> 6h	( <sup>1</sup> S) <sup>2</sup> H <sub>11/2</sub>	2s2p6h	( <sup>1</sup> P) <sup>2</sup> I <sub>13/2</sub>	8.00[12]	8.07[12]	13.591	4.40[10]	3.79[10]	637.45	3.75[10]	5.05[-14]
2s <sup>2</sup> 6h	( <sup>1</sup> S) <sup>2</sup> H <sub>11/2</sub>	2s2p6h	( <sup>1</sup> P) <sup>2</sup> I <sub>11/2</sub>	8.00[12]	8.07[12]	13.591	3.77[10]	4.92[08]	637.45	4.87[08]	6.55[-16]
2s <sup>2</sup> 7h	( <sup>1</sup> S) <sup>2</sup> H <sub>9/2</sub>	2s2p7h	( <sup>1</sup> P) <sup>2</sup> I <sub>11/2</sub>	9.38[12]	9.46[12]	15.196	3.51[10]	3.13[10]	637.48	3.10[10]	3.55[-14]
2s <sup>2</sup> 7h	( <sup>1</sup> S) <sup>2</sup> H <sub>11/2</sub>	2s2p7h	( <sup>1</sup> P) <sup>2</sup> I <sub>13/2</sub>	9.39[12]	9.47[12]	15.196	4.09[10]	3.71[10]	637.48	3.67[10]	4.21[-14]
2s <sup>2</sup> 8h	( <sup>1</sup> S) <sup>2</sup> H <sub>9/2</sub>	2s2p7h	( <sup>1</sup> P) <sup>2</sup> I <sub>11/2</sub>	8.26[12]	8.33[12]	16.237	3.30[10]	3.04[10]	637.48	3.01[10]	3.11[-14]
2s <sup>2</sup> 8h	( <sup>1</sup> S) <sup>2</sup> H <sub>11/2</sub>	2s2p7h	( <sup>1</sup> P) <sup>2</sup> I <sub>13/2</sub>	8.26[12]	8.33[12]	16.237	3.85[10]	3.60[10]	637.48	3.57[10]	3.68[-14]
2s <sup>2</sup> 7h	( <sup>1</sup> S) <sup>2</sup> H <sub>11/2</sub>	2s2p7h	( <sup>1</sup> P) <sup>2</sup> I <sub>11/2</sub>	9.38[12]	9.46[12]	15.196	3.51[10]	4.82[08]	637.48	4.77[08]	5.46[-16]
2s <sup>2</sup> 8h	( <sup>1</sup> S) <sup>2</sup> H <sub>11/2</sub>	2s2p7h	( <sup>1</sup> P) <sup>2</sup> I <sub>11/2</sub>	8.26[12]	8.33[12]	16.237	3.30[10]	4.68[08]	637.48	4.64[08]	4.78[-16]
2s <sup>2</sup> 8f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2s2p8f	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	3.41[13]	4.56[13]	16.254	2.61[10]	1.91[10]	637.55	1.42[10]	1.47[-14]
2s <sup>2</sup> 8f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p8f	( <sup>1</sup> P) <sup>2</sup> G <sub>9/2</sub>	3.41[13]	4.57[13]	16.254	3.26[10]	2.41[10]	637.63	1.80[10]	1.85[-14]
2s <sup>2</sup> 8f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p8f	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	3.41[13]	4.56[13]	16.254	2.61[10]	6.68[08]	637.63	5.00[08]	5.15[-16]
2s <sup>2</sup> 8p	( <sup>1</sup> S) <sup>2</sup> P <sub>1/2</sub>	2s2p8p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	4.11[12]	1.31[13]	16.040	1.68[10]	1.00[10]	637.64	3.16[09]	3.32[-15]
2s <sup>2</sup> 8p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	2s2p8p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	4.11[12]	1.30[13]	16.040	2.52[10]	1.80[10]	637.66	5.71[09]	6.01[-15]
2s <sup>2</sup> 8p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	2s2p8p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	4.11[12]	1.31[13]	16.040	1.68[10]	1.96[09]	637.66	6.17[08]	6.50[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2.13[11]	2.13[11]	4.134	3.11[10]	1.54[08]	637.92	1.43[08]	4.96[-16]
2s <sup>2</sup> 4f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	1.30[11]	1.30[11]	5.756	3.25[10]	1.04[10]	638.18	9.79[09]	2.88[-14]
2s <sup>2</sup> 4f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	1.43[11]	1.43[11]	5.756	4.82[10]	8.08[08]	638.18	7.65[08]	2.25[-15]
2s <sup>2</sup> 4f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	1.43[11]	1.43[11]	5.756	4.82[10]	1.47[10]	638.22	1.39[10]	4.08[-14]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.03[09]	1.03[09]	4.215	1.28[10]	1.40[09]	638.24	5.47[08]	1.88[-15]
2s <sup>2</sup> 7f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p7f	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.63[10]	2.43[12]	15.190	3.93[10]	1.38[10]	638.29	2.05[08]	2.35[-16]
2s <sup>2</sup> 7f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2s2p7f	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	3.94[10]	2.42[12]	15.190	2.63[10]	9.57[09]	638.31	1.55[08]	1.78[-16]
2s <sup>2</sup> 7p	( <sup>1</sup> S) <sup>2</sup> P <sub>1/2</sub>	2s2p7p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	8.21[13]	1.14[14]	14.897	1.15[10]	1.64[09]	638.37	1.18[09]	1.39[-15]
2s <sup>2</sup> 7p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	2s2p7p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	8.21[13]	1.14[14]	14.897	1.15[10]	3.55[09]	638.40	2.55[09]	3.01[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	4.29[09]	4.29[09]	4.209	9.58[09]	1.43[08]	638.41	1.04[08]	3.58[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	4.29[09]	4.29[09]	4.209	9.58[09]	3.43[08]	638.82	2.50[08]	8.60[-16]
2s <sup>2</sup> 7p	( <sup>1</sup> S) <sup>2</sup> P <sub>1/2</sub>	2s2p7p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	4.46[12]	1.59[13]	14.869	1.43[10]	8.34[09]	639.28	2.33[09]	2.76[-15]
2s <sup>2</sup> 7p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	2s2p7p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	4.48[12]	1.60[13]	14.869	2.14[10]	1.48[10]	639.30	4.15[09]	4.91[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	4.60[10]	4.60[10]	4.182	1.10[10]	1.10[08]	639.32	1.07[08]	3.67[-16]
2s <sup>2</sup> 7p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	2s2p7p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	4.46[12]	1.59[13]	14.869	1.43[10]	1.52[09]	639.32	4.25[08]	5.02[-16]
2s <sup>2</sup> 4p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	5.81[08]	5.81[08]	4.141	6.20[10]	5.80[09]	640.40	2.09[08]	7.24[-16]
2s <sup>2</sup> 4p	( <sup>1</sup> S) <sup>2</sup> P <sub>1/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2.13[11]	2.13[11]	4.134	3.11[10]	2.46[09]	640.46	2.29[09]	7.93[-15]
2s <sup>2</sup> 4p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2.13[11]	2.13[11]	4.134	3.11[10]	1.04[09]	640.64	9.71[08]	3.36[-15]
2s <sup>2</sup> 5p	( <sup>1</sup> S) <sup>2</sup> P <sub>1/2</sub>	2s2p5p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.62[08]	4.62[08]	9.875	1.08[10]	2.88[09]	642.34	2.27[08]	4.43[-16]
2s <sup>2</sup> 5p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	2s2p5p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.62[08]	4.62[08]	9.875	1.08[10]	1.42[09]	642.42	1.12[08]	2.19[-16]
2s2p4s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p6p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	1.35[14]	2.00[14]	13.152	1.18[10]	7.68[08]	642.67	5.18[08]	7.28[-16]
2s2p4s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	1.35[14]	2.00[14]	13.152	1.18[10]	1.57[09]	643.49	1.06[09]	1.49[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.69[11]	3.69[11]	3.956	7.14[10]	1.37[08]	644.02	1.33[08]	4.69[-16]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	3.44[11]	3.44[11]	5.888	5.80[09]	3.51[08]	644.48	3.49[08]	1.01[-15]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2.65[11]	2.65[11]	5.875	1.04[10]	4.84[08]	644.91	4.81[08]	1.40[-15]
2s <sup>2</sup> 7f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2p <sup>2</sup> 4d	( <sup>1</sup> D) <sup>2</sup> G <sub>7/2</sub>	1.47[13]	1.74[14]	14.987	1.91[10]	8.69[09]	645.04	7.35[08]	8.59[-16]
2s <sup>2</sup> 7f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2p <sup>2</sup> 4d	( <sup>1</sup> D) <sup>2</sup> G <sub>9/2</sub>	1.48[13]	1.74[14]	14.987	2.39[10]	1.14[10]	645.04	9.66[08]	1.13[-15]
2s <sup>2</sup> 6f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2s2p6f	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	7.72[13]	7.88[13]	13.555	3.08[10]	2.46[10]	645.32	2.41[10]	3.26[-14]
2s <sup>2</sup> 6f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p6f	( <sup>1</sup> P) <sup>2</sup> G <sub>9/2</sub>	7.72[13]	7.88[13]	13.555	3.85[10]	3.20[10]	645.32	3.13[10]	4.22[-14]
2s <sup>2</sup> 6f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p6f	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	7.72[13]	7.88[13]	13.555	3.08[10]	9.26[08]	645.32	9.08[08]	1.22[-15]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> S <sub>1/2</sub>	1.03[14]	1.03[14]	5.805	9.73[09]	3.88[08]	647.23	3.88[08]	1.14[-15]



Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{eff}$
Conf.	<i>LSJ</i>	Conf.	<i>LSJ</i>	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	$\text{\AA}$	$s^{-1}$	$cm^3/s$
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> S <sub>1/2</sub>	1.03[14]	1.03[14]	5.805	9.73[09]	1.96[08]	647.28	1.95[08]	5.73[-16]
2s <sup>2</sup> 4p	( <sup>1</sup> S) <sup>2</sup> P <sub>1/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	3.79[13]	3.79[13]	3.929	1.91[10]	4.85[08]	647.30	4.84[08]	1.71[-15]
2s <sup>2</sup> 4p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	3.79[13]	3.79[13]	3.929	1.91[10]	1.25[09]	647.48	1.25[09]	4.43[-15]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	3.80[12]	3.80[12]	5.751	1.70[10]	1.18[08]	649.09	1.18[08]	3.47[-16]
2s <sup>2</sup> 5p	( <sup>1</sup> S) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	8.55[11]	8.55[11]	9.610	6.72[10]	1.46[09]	651.30	1.43[09]	2.86[-15]
2s <sup>2</sup> 5p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	8.55[11]	8.55[11]	9.610	6.72[10]	2.86[08]	651.37	2.80[08]	5.61[-16]
2s <sup>2</sup> 5p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	8.59[11]	8.59[11]	9.608	1.00[11]	2.59[09]	651.42	2.54[09]	5.09[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> F <sub>7/2</sub>	1.32[10]	1.32[10]	3.632	3.43[11]	2.08[09]	655.07	4.87[08]	1.77[-15]
2s <sup>2</sup> 4p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.96[11]	1.96[11]	3.703	3.86[10]	1.83[09]	655.22	1.78[09]	6.42[-15]
2s <sup>2</sup> 4p	( <sup>1</sup> S) <sup>2</sup> P <sub>1/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	1.92[11]	1.92[11]	3.697	3.09[10]	5.38[08]	655.23	5.17[08]	1.87[-15]
2s <sup>2</sup> 4p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	1.92[11]	1.92[11]	3.697	3.09[10]	1.28[09]	655.42	1.23[09]	4.44[-15]
2s <sup>2</sup> 4p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> D <sub>5/2</sub>	5.44[11]	5.44[11]	3.691	8.43[10]	4.44[09]	655.66	4.33[09]	1.57[-14]
2s <sup>2</sup> 4p	( <sup>1</sup> S) <sup>2</sup> P <sub>1/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> D <sub>1/2</sub>	2.43[09]	2.43[09]	3.684	2.96[09]	1.79[08]	655.70	1.11[08]	4.04[-16]
2s <sup>2</sup> 4p	( <sup>1</sup> S) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> D <sub>3/2</sub>	5.47[11]	5.47[11]	3.679	5.46[10]	3.07[09]	655.88	2.99[09]	1.08[-14]
2s <sup>2</sup> 4p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	7.29[09]	7.29[09]	3.680	4.88[09]	3.31[08]	656.02	2.83[08]	1.03[-15]
2s <sup>2</sup> 4p	( <sup>1</sup> S) <sup>2</sup> P <sub>1/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2.18[09]	2.18[09]	3.665	3.61[09]	2.21[08]	656.37	1.21[08]	4.37[-16]
2s <sup>2</sup> 5f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p5p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2.06[12]	2.06[12]	10.077	2.93[10]	1.17[09]	658.91	1.17[09]	2.24[-15]
2s <sup>2</sup> 5f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2s2p5p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2.04[12]	2.04[12]	10.077	1.96[10]	8.31[08]	658.92	8.29[08]	1.58[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.02[11]	3.02[11]	4.328	3.70[10]	1.37[09]	668.41	1.34[09]	4.57[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.02[11]	3.02[11]	4.291	3.70[10]	1.15[09]	669.73	1.13[09]	3.85[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2.07[10]	2.07[10]	4.319	6.67[10]	3.48[09]	669.83	2.48[09]	8.43[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.02[11]	3.02[11]	4.291	3.70[10]	2.57[08]	670.81	2.52[08]	8.58[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	3.91[11]	3.91[11]	4.247	1.16[10]	5.26[09]	672.42	5.25[09]	1.80[-14]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	3.68[11]	3.68[11]	4.216	1.11[10]	4.15[09]	672.47	4.13[09]	1.42[-14]
2s <sup>2</sup> 8h	( <sup>1</sup> S) <sup>2</sup> H <sub>11/2</sub>	2s2p7h	( <sup>1</sup> P) <sup>2</sup> I <sub>3/2</sub>	9.39[12]	9.47[12]	15.196	4.09[10]	1.03[08]	673.56	1.02[08]	1.17[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	4.60[10]	4.60[10]	4.182	1.10[10]	3.96[08]	673.71	3.84[08]	1.32[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> G <sub>9/2</sub>	4.38[10]	4.38[10]	4.194	1.39[10]	4.06[08]	674.35	3.94[08]	1.35[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.58[11]	3.58[11]	4.416	9.16[10]	2.88[08]	675.48	2.76[08]	9.30[-16]
2s <sup>2</sup> 5f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	8.55[11]	8.55[11]	9.610	6.72[10]	4.04[09]	675.68	3.96[09]	7.92[-15]
2s <sup>2</sup> 5f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	8.59[11]	8.59[11]	9.608	1.00[11]	5.77[09]	675.74	5.66[09]	1.13[-14]
2s <sup>2</sup> 5f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	8.59[11]	8.59[11]	9.608	1.00[11]	2.91[08]	675.74	2.85[08]	5.71[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	3.20[11]	3.20[11]	4.412	6.03[10]	1.76[08]	676.21	1.68[08]	5.65[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	6.82[11]	6.82[11]	4.328	1.43[10]	5.43[08]	678.72	5.40[08]	1.83[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.02[11]	3.02[11]	4.328	3.70[10]	2.47[09]	678.75	2.42[09]	8.22[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	1.54[14]	1.54[14]	4.325	9.31[09]	1.39[08]	678.83	1.39[08]	4.71[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	6.82[11]	6.82[11]	4.328	1.43[10]	2.58[09]	679.32	2.57[09]	8.73[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.02[11]	3.02[11]	4.291	3.70[10]	2.37[09]	680.10	2.32[09]	7.91[-15]
2s <sup>2</sup> 4p	( <sup>1</sup> S) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	6.84[12]	6.84[12]	2.905	3.75[10]	2.46[08]	683.86	2.45[08]	9.60[-16]
2s <sup>2</sup> 4p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	6.84[12]	6.84[12]	2.905	3.75[10]	4.63[08]	684.06	4.62[08]	1.81[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	6.10[11]	6.10[11]	2.761	1.66[11]	2.68[08]	686.40	2.57[08]	1.02[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	6.22[11]	6.22[11]	2.758	1.09[11]	1.94[09]	686.51	1.86[09]	7.39[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2.13[11]	2.13[11]	4.134	3.11[10]	1.38[08]	686.63	1.29[08]	4.45[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	6.10[11]	6.10[11]	2.761	1.66[11]	2.95[09]	686.66	2.83[09]	1.12[-14]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	6.22[11]	6.22[11]	2.758	1.09[11]	2.23[08]	686.76	2.14[08]	8.50[-16]
2s <sup>2</sup> 4f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	3.91[11]	3.91[11]	4.247	1.16[10]	1.20[08]	691.97	1.19[08]	4.08[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> D <sub>3/2</sub>	5.47[11]	5.47[11]	3.679	5.46[10]	1.15[08]	692.64	1.12[08]	4.07[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.69[11]	3.69[11]	3.956	7.14[10]	3.13[08]	692.83	3.04[08]	1.07[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> D <sub>5/2</sub>	5.44[11]	5.44[11]	3.691	8.43[10]	1.77[08]	693.35	1.72[08]	6.23[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	3.79[13]	3.79[13]	3.929	1.91[10]	1.58[08]	693.87	1.58[08]	5.58[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	3.65[11]	3.65[11]	3.930	5.04[10]	1.90[08]	694.46	1.84[08]	6.50[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> F <sub>7/2</sub>	1.32[10]	1.32[10]	3.632	3.43[11]	2.42[09]	695.64	5.67[08]	2.06[-15]
2s <sup>2</sup> 7f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p6f	( <sup>1</sup> P) <sup>2</sup> G <sub>9/2</sub>	7.72[13]	7.88[13]	13.555	3.85[10]	1.05[08]	696.99	1.03[08]	1.39[-16]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.58[11]	3.58[11]	4.416	9.16[10]	1.32[09]	697.86	1.27[09]	4.26[-15]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{SH}$
Conf.	$LSJ$	Conf.	$LSJ$	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	Å	$s^{-1}$	$cm^3/s$
2s2p3s	( <sup>1</sup> P) <sup>2</sup> F <sub>3/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	3.20[11]	3.20[11]	4.412	6.03[10]	1.50[08]	698.00	1.43[08]	4.81[-16]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	3.20[11]	3.20[11]	4.412	6.03[10]	7.57[08]	698.05	7.23[08]	2.43[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2.25[09]	2.25[09]	1.653	1.37[10]	2.45[09]	698.41	9.70[08]	4.30[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	9.80[08]	9.80[08]	1.655	2.05[10]	3.24[09]	698.72	7.22[08]	3.20[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2.25[09]	2.25[09]	1.653	1.37[10]	7.82[08]	698.82	3.10[08]	1.37[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	9.80[08]	9.80[08]	1.655	2.05[10]	1.20[09]	699.31	2.68[08]	1.19[-15]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.02[11]	3.02[11]	4.328	3.70[10]	3.21[08]	701.34	3.15[08]	1.07[-15]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	6.82[11]	6.82[11]	4.328	1.43[10]	3.97[08]	701.36	3.95[08]	1.34[-15]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	1.54[14]	1.54[14]	4.325	9.31[09]	1.20[08]	701.43	1.20[08]	4.08[-16]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.02[11]	3.02[11]	4.291	3.70[10]	4.03[08]	702.79	3.95[08]	1.35[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	8.39[09]	8.39[09]	1.555	1.87[10]	1.00[09]	703.28	8.20[08]	3.67[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.36[10]	1.36[10]	1.527	1.51[10]	1.30[09]	703.79	1.15[09]	5.14[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	8.39[09]	8.39[09]	1.555	1.87[10]	1.94[08]	704.07	1.59[08]	7.11[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.36[10]	1.36[10]	1.527	1.51[10]	1.93[08]	704.39	1.70[08]	7.62[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> G <sub>5/2</sub>	2.81[07]	2.81[07]	1.491	1.36[10]	8.66[09]	704.83	1.06[08]	4.78[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	2.89[08]	2.89[08]	1.498	1.78[10]	1.05[10]	704.97	1.20[09]	5.42[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	2.89[08]	2.89[08]	1.498	1.78[10]	1.04[09]	705.57	1.20[08]	5.41[-16]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2.13[11]	2.13[11]	4.134	3.11[10]	2.22[08]	709.11	2.07[08]	7.17[-16]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2.13[11]	2.13[11]	4.134	3.11[10]	4.37[08]	709.16	4.07[08]	1.41[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p5f	( <sup>1</sup> P) <sup>2</sup> G <sub>9/2</sub>	1.31[14]	1.39[14]	10.923	4.97[10]	2.20[10]	709.56	2.08[10]	3.66[-14]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p5f	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.31[14]	1.39[14]	10.922	3.97[10]	1.70[10]	709.57	1.61[10]	2.82[-14]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p5f	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.31[14]	1.39[14]	10.922	3.97[10]	6.29[08]	709.57	5.95[08]	1.05[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2.84[08]	2.84[08]	1.757	2.03[10]	2.07[09]	713.18	1.60[08]	7.03[-16]
2s <sup>2</sup> 4f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> D <sub>5/2</sub>	5.44[11]	5.44[11]	3.691	8.43[10]	1.46[08]	714.15	1.42[08]	5.14[-16]
2s <sup>2</sup> 4f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> F <sub>7/2</sub>	1.32[10]	1.32[10]	3.632	3.43[11]	1.30[09]	716.58	3.04[08]	1.11[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>1/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2.25[09]	2.25[09]	1.653	1.37[10]	5.98[09]	717.13	2.37[09]	1.05[-14]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	9.80[08]	9.80[08]	1.655	2.05[10]	9.63[09]	717.16	2.14[09]	9.51[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2.25[09]	2.25[09]	1.653	1.37[10]	2.10[09]	717.27	8.29[08]	3.68[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	9.80[08]	9.80[08]	1.655	2.05[10]	2.42[09]	717.40	5.38[08]	2.39[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	1.14[09]	1.14[09]	1.891	3.41[10]	1.62[10]	721.40	3.42[09]	1.48[-14]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	1.48[09]	1.48[09]	1.872	2.52[10]	1.18[10]	721.93	3.06[09]	1.33[-14]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	1.48[09]	1.48[09]	1.872	2.52[10]	7.56[08]	722.21	1.97[08]	8.53[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	1.14[09]	1.14[09]	1.891	3.41[10]	8.96[08]	724.94	1.89[08]	8.20[-16]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	1.92[11]	1.92[11]	3.697	3.09[10]	1.19[08]	727.27	1.14[08]	4.14[-16]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	1.92[11]	1.92[11]	3.697	3.09[10]	1.85[08]	727.32	1.77[08]	6.42[-16]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> D <sub>5/2</sub>	5.44[11]	5.44[11]	3.691	8.43[10]	2.21[08]	727.56	2.15[08]	7.79[-16]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> D <sub>3/2</sub>	5.47[11]	5.47[11]	3.679	5.46[10]	2.52[08]	728.06	2.45[08]	8.89[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	6.10[11]	6.10[11]	2.761	1.66[11]	2.72[08]	730.08	2.60[08]	1.03[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	6.22[11]	6.22[11]	2.758	1.09[11]	3.68[09]	730.19	3.52[09]	1.40[-14]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2.84[08]	2.84[08]	1.757	2.03[10]	4.02[09]	730.66	3.11[08]	1.36[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2.46[08]	2.46[08]	1.763	1.35[10]	4.90[09]	730.94	3.34[08]	1.46[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2.84[08]	2.84[08]	1.757	2.03[10]	9.27[09]	731.20	7.17[08]	3.15[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2.46[08]	2.46[08]	1.763	1.35[10]	3.78[09]	731.28	2.57[08]	1.13[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	6.10[11]	6.10[11]	2.761	1.66[11]	5.25[09]	731.37	5.03[09]	2.00[-14]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2.16[09]	2.16[09]	1.299	2.89[11]	7.96[09]	732.86	3.42[08]	1.57[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.48[10]	1.48[10]	0.822	7.31[09]	3.98[08]	733.16	3.68[08]	1.77[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> D <sub>1/2</sub>	2.97[08]	2.97[08]	0.807	2.43[09]	7.34[08]	733.32	1.44[08]	6.95[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2.47[08]	2.47[08]	0.813	6.27[09]	1.11[09]	733.56	1.51[08]	7.28[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.48[10]	1.48[10]	0.822	7.31[09]	1.58[09]	733.81	1.46[09]	7.01[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	1.38[08]	1.38[08]	0.836	1.55[10]	1.95[09]	734.03	1.30[08]	6.27[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	6.84[12]	6.84[12]	2.905	3.75[10]	5.65[08]	736.05	5.63[08]	2.20[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	6.84[12]	6.84[12]	2.905	3.75[10]	2.97[08]	736.76	2.96[08]	1.16[-15]
2s <sup>2</sup> 8h	( <sup>1</sup> S) <sup>2</sup> H <sub>9/2</sub>	2s2p6h	( <sup>1</sup> P) <sup>2</sup> I <sub>11/2</sub>	8.00[12]	8.07[12]	13.591	3.77[10]	1.05[08]	737.86	1.04[08]	1.40[-16]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{\text{eff}}$
Conf.	LSJ	Conf.	LSJ	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	Å	$s^{-1}$	$\text{cm}^3/s$
2s <sup>2</sup> 8h	( <sup>1</sup> S) <sup>2</sup> H <sub>11/2</sub>	2s2p6h	( <sup>1</sup> P) <sup>2</sup> I <sub>13/2</sub>	8.00[12]	8.07[12]	13.591	4.40[10]	1.25[08]	737.86	1.23[08]	1.66[-16]
2s <sup>2</sup> 4f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> G <sub>9/2</sub>	4.28[13]	4.28[13]	3.091	3.77[09]	2.84[09]	739.68	2.84[09]	1.09[-14]
2s <sup>2</sup> 4f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> G <sub>7/2</sub>	4.27[13]	4.27[13]	3.090	3.06[09]	2.17[09]	739.69	2.17[09]	8.35[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	9.64[11]	9.64[11]	1.400	2.27[10]	2.35[08]	742.34	2.33[08]	1.06[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	6.10[11]	6.10[11]	2.761	1.66[11]	8.60[09]	742.42	8.23[09]	3.27[-14]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	6.22[11]	6.22[11]	2.758	1.09[11]	9.84[08]	742.54	9.43[08]	3.74[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	6.22[11]	6.22[11]	2.758	1.09[11]	4.83[09]	743.26	4.63[09]	1.84[-14]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	8.59[11]	8.59[11]	1.385	3.33[10]	3.69[08]	743.30	3.67[08]	1.67[-15]
2s <sup>2</sup> 6f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2s2p5f	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.31[14]	1.39[14]	10.922	3.97[10]	3.97[09]	747.76	3.76[09]	6.61[-15]
2s <sup>2</sup> 6f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p5f	( <sup>1</sup> P) <sup>2</sup> G <sub>9/2</sub>	1.31[14]	1.39[14]	10.923	4.97[10]	5.15[09]	747.76	4.88[09]	8.57[-15]
2s <sup>2</sup> 6f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p5f	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.31[14]	1.39[14]	10.922	3.97[10]	1.47[08]	747.76	1.40[08]	2.45[-16]
2s2p4s	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2p <sup>2</sup> 4s	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2.01[09]	2.01[09]	9.730	1.09[10]	8.46[08]	749.37	2.29[08]	4.53[-16]
2s2p4s	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2p <sup>2</sup> 4s	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	8.85[07]	8.85[07]	9.779	3.28[10]	1.07[10]	749.41	1.70[08]	3.35[-16]
2s2p4s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2p <sup>2</sup> 4s	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2.01[09]	2.01[09]	9.730	1.09[10]	4.23[09]	750.19	1.14[09]	2.26[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2.16[09]	2.16[09]	1.299	2.89[11]	2.70[09]	750.93	1.16[08]	5.32[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	5.75[08]	5.75[08]	0.416	9.16[09]	9.42[08]	751.17	2.58[08]	1.29[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2.47[08]	2.47[08]	0.405	6.27[09]	2.46[09]	751.67	3.35[08]	1.68[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	5.75[08]	5.75[08]	0.416	9.16[09]	3.80[09]	751.85	1.04[09]	5.22[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	7.30[09]	7.30[09]	0.753	4.34[10]	6.80[08]	756.90	3.41[08]	1.66[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	1.46[09]	1.46[09]	0.746	2.52[10]	6.57[08]	756.96	1.24[08]	6.03[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	1.46[09]	1.46[09]	0.746	2.52[10]	1.19[09]	757.23	2.24[08]	1.09[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	7.30[09]	7.30[09]	0.753	4.34[10]	2.69[09]	757.32	1.35[09]	6.55[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>1/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2.41[10]	2.41[10]	0.732	1.28[10]	5.29[08]	757.45	4.18[08]	2.03[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p5p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2.04[12]	2.04[12]	10.077	1.96[10]	4.55[08]	757.50	4.54[08]	8.67[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2.41[10]	2.41[10]	0.732	1.28[10]	5.02[08]	757.60	3.96[08]	1.93[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p5p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2.06[12]	2.06[12]	10.077	2.93[10]	7.02[08]	757.64	7.01[08]	1.34[-15]
2s <sup>2</sup> 4p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	1.06[13]	1.06[13]	1.069	1.06[10]	1.48[08]	761.18	1.48[08]	6.94[-16]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	6.84[12]	6.84[12]	2.905	3.75[10]	4.70[09]	762.70	4.68[09]	1.83[-14]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	6.84[12]	6.84[12]	2.905	3.75[10]	2.30[09]	762.76	2.29[09]	8.98[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	4.70[12]	4.70[12]	0.953	2.90[10]	1.03[08]	763.08	1.03[08]	4.90[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	8.02[08]	8.02[08]	0.129	1.89[10]	1.18[09]	765.18	3.52[08]	1.82[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.92[08]	1.92[08]	0.112	1.52[10]	1.46[09]	765.26	1.35[08]	6.96[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.53[10]	4.53[10]	0.892	2.57[10]	1.03[09]	765.62	7.99[08]	3.83[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2.52[08]	2.52[08]	0.091	7.65[09]	4.05[09]	765.78	4.71[08]	2.44[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	1.07[08]	1.07[08]	0.100	1.14[10]	5.14[09]	765.86	2.73[08]	1.41[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.92[08]	1.92[08]	0.112	1.52[10]	7.67[09]	765.97	7.05[08]	3.65[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	8.02[08]	8.02[08]	0.129	1.89[10]	1.19[10]	766.11	3.56[09]	1.84[-14]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	4.76[09]	4.76[09]	0.885	4.66[10]	1.41[09]	766.27	4.09[08]	1.96[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2.52[08]	2.52[08]	0.091	7.65[09]	1.13[09]	766.28	1.31[08]	6.79[-16]
2s <sup>2</sup> 4p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	4.70[12]	4.70[12]	0.953	2.90[10]	1.39[08]	766.65	1.38[08]	6.59[-16]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.92[08]	1.92[08]	0.112	1.52[10]	1.30[09]	766.90	1.19[08]	6.16[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	8.55[11]	8.55[11]	9.610	6.72[10]	3.76[09]	767.20	3.68[09]	7.38[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	8.59[11]	8.59[11]	9.608	1.00[11]	5.37[09]	767.27	5.27[09]	1.05[-14]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	8.59[11]	8.59[11]	9.608	1.00[11]	2.67[08]	767.27	2.62[08]	5.25[-16]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	6.10[11]	6.10[11]	2.761	1.66[11]	2.96[09]	769.54	2.84[09]	1.13[-14]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	6.22[11]	6.22[11]	2.758	1.09[11]	3.33[08]	769.67	3.19[08]	1.27[-15]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	6.22[11]	6.22[11]	2.758	1.09[11]	1.72[09]	769.73	1.65[09]	6.55[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	1.48[09]	1.48[09]	1.872	2.52[10]	5.16[09]	770.40	1.34[09]	5.83[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	1.14[09]	1.14[09]	1.891	3.41[10]	7.08[09]	770.91	1.50[09]	6.48[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.48[10]	1.48[10]	0.822	7.31[09]	3.82[08]	773.30	3.53[08]	1.70[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.48[10]	1.48[10]	0.822	7.31[09]	6.26[08]	773.91	5.78[08]	2.79[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	8.55[11]	8.55[11]	9.610	6.72[10]	2.22[09]	779.75	2.18[09]	4.36[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	8.59[11]	8.59[11]	9.608	1.00[11]	2.47[08]	779.82	2.42[08]	4.85[-16]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{\text{eff}}$
Conf.	$LSJ$	Conf.	$LSJ$	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	$\text{\AA}$	$s^{-1}$	$\text{cm}^3/s$
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	8.55[11]	8.55[11]	9.610	6.72[10]	2.46[08]	779.91	2.41[08]	4.83[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	8.59[11]	8.59[11]	9.608	1.00[11]	3.48[09]	779.98	3.41[09]	6.83[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.91[09]	4.91[09]	0.522	2.16[10]	2.38[09]	783.54	7.43[08]	3.69[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	4.76[09]	4.76[09]	0.517	4.66[10]	5.08[08]	783.77	1.47[08]	7.33[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	4.76[09]	4.76[09]	0.517	4.66[10]	4.56[09]	784.10	1.32[09]	6.58[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.36[10]	1.36[10]	1.527	1.51[10]	8.01[09]	787.26	7.03[09]	3.16[-14]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	8.02[08]	8.02[08]	0.129	1.89[10]	3.71[09]	787.33	1.11[09]	5.72[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	8.39[09]	8.39[09]	1.555	1.87[10]	1.07[10]	787.37	8.74[09]	3.91[-14]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.92[08]	1.92[08]	0.112	1.52[10]	2.59[09]	787.72	2.38[08]	1.23[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> D <sub>1/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2.52[08]	2.52[08]	0.091	7.65[09]	1.13[09]	788.35	1.31[08]	6.79[-16]
2s2p4s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	8.59[11]	8.59[11]	9.608	1.00[11]	1.37[08]	788.50	1.34[08]	2.68[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	2.89[08]	2.89[08]	1.498	1.78[10]	1.01[09]	788.73	1.17[08]	5.26[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.36[10]	1.36[10]	1.527	1.51[10]	1.72[08]	788.77	1.51[08]	6.79[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>3/2</sub>	2s2p5p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2.11[14]	2.11[14]	10.210	1.19[10]	1.08[08]	790.70	1.08[08]	2.03[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	9.64[11]	9.64[11]	1.400	2.27[10]	5.28[08]	793.69	5.25[08]	2.39[-15]
2s2p3d	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	5.75[08]	5.75[08]	0.416	9.16[09]	5.94[08]	794.00	1.62[08]	8.16[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	8.59[11]	8.59[11]	1.385	3.33[10]	6.36[08]	795.97	6.31[08]	2.88[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>3/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	9.64[11]	9.64[11]	1.400	2.27[10]	1.46[08]	808.30	1.45[08]	6.60[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>3/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	8.59[11]	8.59[11]	1.385	3.33[10]	1.22[09]	809.08	1.21[09]	5.53[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	9.64[11]	9.64[11]	1.400	2.27[10]	6.43[08]	809.15	6.39[08]	2.91[-15]
2s <sup>2</sup> 6f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	8.55[11]	8.55[11]	9.610	6.72[10]	7.45[08]	812.05	7.30[08]	1.46[-15]
2s <sup>2</sup> 6f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	8.59[11]	8.59[11]	9.608	1.00[11]	1.07[09]	812.13	1.04[09]	2.09[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	4.70[12]	4.70[12]	0.953	2.90[10]	1.07[08]	817.07	1.07[08]	5.11[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	4.45[12]	4.45[12]	0.926	2.01[10]	1.07[09]	818.53	1.07[09]	5.10[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	4.70[12]	4.70[12]	0.953	2.90[10]	1.62[09]	818.69	1.62[09]	7.69[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	8.55[11]	8.55[11]	9.610	6.72[10]	9.71[08]	822.04	9.53[08]	1.91[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	8.55[11]	8.55[11]	9.610	6.72[10]	1.95[08]	822.15	1.91[08]	3.83[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	8.59[11]	8.59[11]	9.608	1.00[11]	1.75[09]	822.23	1.72[09]	3.45[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2.37[09]	2.37[09]	0.786	5.39[10]	2.48[09]	826.17	5.18[08]	2.51[-15]
2s <sup>2</sup> 5f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> G <sub>9/2</sub>	1.63[14]	1.63[14]	6.258	6.94[10]	4.77[09]	826.70	4.76[09]	1.33[-14]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	9.99[08]	9.99[08]	0.806	6.41[10]	2.92[09]	826.71	3.24[08]	1.56[-15]
2s <sup>2</sup> 5f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.63[14]	1.63[14]	6.257	5.55[10]	3.68[09]	826.72	3.67[09]	1.03[-14]
2s <sup>2</sup> 5f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.63[14]	1.63[14]	6.257	5.55[10]	1.36[08]	826.73	1.36[08]	3.80[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.53[10]	4.53[10]	0.892	2.57[10]	1.96[08]	835.97	1.53[08]	7.30[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	4.76[09]	4.76[09]	0.885	4.66[10]	7.99[08]	836.36	2.32[08]	1.11[-15]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.53[10]	4.53[10]	0.892	2.57[10]	3.34[08]	836.88	2.60[08]	1.25[-15]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	8.59[11]	8.59[11]	1.385	3.33[10]	1.29[08]	841.39	1.28[08]	5.82[-16]
2s2p3d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	4.76[09]	4.76[09]	0.517	4.66[10]	3.46[08]	857.66	1.00[08]	4.99[-16]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	1.06[13]	1.06[13]	1.069	1.06[10]	7.11[08]	859.83	7.11[08]	3.34[-15]
2s2p3s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	1.06[13]	1.06[13]	1.069	1.06[10]	4.07[08]	859.90	4.06[08]	1.91[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p5f	( <sup>1</sup> P) <sup>2</sup> G <sub>9/2</sub>	1.31[14]	1.39[14]	10.923	4.97[10]	1.20[08]	868.44	1.13[08]	1.99[-16]
2s2p4s	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p8p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	7.73[09]	7.73[09]	6.727	1.76[09]	2.19[08]	918.92	2.11[08]	5.62[-16]
2s2p4s	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2s2p8p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	5.25[09]	5.25[09]	6.649	1.37[09]	1.26[08]	920.88	1.19[08]	3.19[-16]
2s2p4s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p8p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	9.31[09]	9.31[09]	6.664	1.95[09]	2.61[08]	921.09	2.52[08]	6.78[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> G <sub>9/2</sub>	1.63[14]	1.63[14]	6.258	6.94[10]	3.42[10]	967.97	3.42[10]	9.58[-14]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.63[14]	1.63[14]	6.257	5.55[10]	9.78[08]	968.00	9.78[08]	2.74[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.63[14]	1.63[14]	6.257	5.55[10]	2.64[10]	968.01	2.64[10]	7.39[-14]
2s <sup>2</sup> 3p	( <sup>3</sup> P) <sup>4</sup> D <sub>1/2</sub>	2p <sup>2</sup> 4s	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2.01[09]	2.01[09]	9.730	1.09[10]	9.11[08]	980.44	2.46[08]	4.87[-16]
2s <sup>2</sup> 3p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2p <sup>2</sup> 4s	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2.01[09]	2.01[09]	9.730	1.09[10]	9.35[08]	981.23	2.53[08]	5.00[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	8.81[09]	8.81[09]	5.938	7.48[10]	5.22[08]	992.74	2.53[08]	7.31[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	4.16[09]	4.16[09]	5.938	5.62[10]	3.95[08]	992.78	1.22[08]	3.51[-16]
2s2p4s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	5.69[09]	5.69[09]	5.509	1.52[09]	1.42[08]	1007.52	1.36[08]	4.11[-16]
2s <sup>2</sup> 6p	( <sup>1</sup> S) <sup>2</sup> P <sub>1/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	1.30[11]	1.30[11]	5.756	3.25[10]	2.24[08]	1008.28	2.11[08]	6.20[-16]

Low level		Upper level		A <sub>a</sub>	ΣA <sub>a</sub>	E <sub>S</sub>	ΣgA <sub>r</sub>	gA <sub>r</sub>	λ	Q <sub>d</sub>	C <sub>S</sub> <sup>H</sup>
Conf.	LSJ	Conf.	LSJ	s <sup>-1</sup>	s <sup>-1</sup>	eV	s <sup>-1</sup>	s <sup>-1</sup>	Å	s <sup>-1</sup>	cm <sup>3</sup> /s
2s <sup>2</sup> 6p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	1.43[11]	1.43[11]	5.756	4.82[10]	4.27[08]	1009.37	4.04[08]	1.19[-15]
2s <sup>2</sup> 3p	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2p <sup>2</sup> 4s	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2.01[09]	2.01[09]	9.730	1.09[10]	4.84[08]	1013.34	1.31[08]	2.59[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	4.16[09]	4.16[09]	5.938	5.62[10]	1.87[10]	1013.88	5.74[09]	1.66[-14]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	8.81[09]	8.81[09]	5.938	7.48[10]	2.65[10]	1014.13	1.28[10]	3.71[-14]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	4.16[09]	4.16[09]	5.938	5.62[10]	1.28[09]	1014.16	3.94[08]	1.14[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2.65[11]	2.65[11]	5.875	1.04[10]	1.13[09]	1019.16	1.13[09]	3.27[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2.65[11]	2.65[11]	5.875	1.04[10]	2.22[08]	1019.44	2.21[08]	6.42[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	3.80[10]	3.80[10]	5.855	9.52[09]	1.28[09]	1021.07	1.24[09]	3.61[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	8.15[10]	8.15[10]	5.848	9.77[09]	2.40[09]	1021.66	2.36[09]	6.89[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	4.89[10]	4.89[10]	5.825	8.97[09]	1.61[09]	1023.31	1.56[09]	4.56[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	8.15[10]	8.15[10]	5.814	9.77[09]	1.60[09]	1024.58	1.58[09]	4.62[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>4</sup> G <sub>5/2</sub>	4.32[09]	4.32[09]	5.794	5.58[09]	1.58[08]	1025.97	1.30[08]	3.82[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	1.30[11]	1.30[11]	5.756	3.25[10]	8.66[08]	1029.16	8.15[08]	2.40[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	1.43[11]	1.43[11]	5.756	4.82[10]	1.37[09]	1029.46	1.29[09]	3.80[-15]
2s <sup>2</sup> 6f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> G <sub>9/2</sub>	1.63[14]	1.63[14]	6.258	6.94[10]	1.03[10]	1040.47	1.03[10]	2.89[-14]
2s <sup>2</sup> 6f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.63[14]	1.63[14]	6.257	5.55[10]	7.95[09]	1040.51	7.95[09]	2.23[-14]
2s <sup>2</sup> 6f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.63[14]	1.63[14]	6.257	5.55[10]	2.95[08]	1040.51	2.95[08]	8.26[-16]
2s2p4s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	1.30[11]	1.30[11]	5.756	3.25[10]	2.10[08]	1042.20	1.98[08]	5.83[-16]
2s2p4s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	1.43[11]	1.43[11]	5.756	4.82[10]	3.52[08]	1044.36	3.33[08]	9.81[-16]
2s2p4s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	8.74[11]	8.74[11]	5.659	1.81[10]	3.79[08]	1052.96	3.77[08]	1.12[-15]
2s2p4s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	8.67[11]	8.67[11]	5.630	1.23[10]	1.60[08]	1053.41	1.59[08]	4.75[-16]
2s2p4s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	5.62[10]	5.62[10]	5.530	8.55[09]	1.60[08]	1062.40	1.49[08]	4.48[-16]
2s2p4s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2.60[10]	2.60[10]	5.552	1.36[10]	2.68[08]	1062.64	2.37[08]	7.11[-16]
2s <sup>2</sup> 6f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	8.81[09]	8.81[09]	5.938	7.48[10]	2.18[08]	1069.15	1.06[08]	3.05[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2.65[11]	2.65[11]	5.875	1.04[10]	1.53[08]	1092.83	1.52[08]	4.43[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	1.30[11]	1.30[11]	5.756	3.25[10]	8.36[09]	1104.13	7.87[09]	2.32[-14]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	1.30[11]	1.30[11]	5.756	3.25[10]	1.68[09]	1104.34	1.58[09]	4.65[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	1.43[11]	1.43[11]	5.756	4.82[10]	1.50[10]	1104.36	1.42[10]	4.17[-14]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	9.54[10]	9.54[10]	6.871	7.51[09]	1.12[08]	1125.13	1.10[08]	2.90[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	2.35[09]	2.35[09]	6.862	6.98[09]	3.20[08]	1126.99	2.34[08]	6.15[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> G <sub>5/2</sub>	1.14[10]	1.14[10]	6.843	3.67[09]	4.43[08]	1128.00	4.21[08]	1.11[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	1.92[08]	1.92[08]	6.859	5.26[09]	6.51[08]	1128.91	1.74[08]	4.59[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.30[09]	1.30[09]	6.844	4.80[09]	3.61[08]	1128.92	2.47[08]	6.52[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.58[11]	3.58[11]	4.416	9.16[10]	5.73[08]	1130.56	5.50[08]	1.85[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	3.20[11]	3.20[11]	4.412	6.03[10]	4.06[08]	1130.93	3.88[08]	1.30[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.85[10]	1.85[10]	6.903	4.20[09]	1.31[08]	1140.25	1.26[08]	3.31[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2.07[10]	2.07[10]	4.319	6.67[10]	1.90[08]	1140.68	1.35[08]	4.60[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.30[09]	1.30[09]	6.898	4.80[09]	1.79[08]	1140.77	1.22[08]	3.21[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.30[09]	1.30[09]	6.898	4.80[09]	1.84[08]	1141.94	1.26[08]	3.31[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	1.92[08]	1.92[08]	6.894	5.26[09]	5.91[08]	1142.27	1.58[08]	4.15[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>1/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	1.74[10]	1.74[10]	6.860	2.56[09]	2.85[08]	1143.81	2.75[08]	7.25[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	4.62[09]	4.62[09]	6.868	5.31[09]	2.28[08]	1143.90	1.99[08]	5.24[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> G <sub>5/2</sub>	1.14[10]	1.14[10]	6.843	3.67[09]	1.07[08]	1145.96	1.02[08]	2.68[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.30[09]	1.30[09]	6.844	4.80[09]	3.06[08]	1146.46	2.09[08]	5.53[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.85[10]	1.85[10]	6.903	4.20[09]	1.64[08]	1154.14	1.58[08]	4.14[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.30[09]	1.30[09]	6.898	4.80[09]	2.98[08]	1154.67	2.04[08]	5.37[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	8.50[09]	8.50[09]	6.907	2.66[09]	2.31[08]	1155.21	2.14[08]	5.62[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.85[10]	1.85[10]	6.903	4.20[09]	2.99[08]	1155.69	2.88[08]	7.55[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	8.50[09]	8.50[09]	6.907	2.66[09]	1.61[08]	1156.04	1.49[08]	3.91[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	4.62[09]	4.62[09]	6.868	5.31[09]	1.94[08]	1157.88	1.69[08]	4.46[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.58[11]	3.58[11]	4.416	9.16[10]	4.68[08]	1158.38	4.49[08]	1.51[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	3.20[11]	3.20[11]	4.412	6.03[10]	2.99[08]	1158.40	2.85[08]	9.60[-16]
2s <sup>2</sup> 3p	( <sup>3</sup> P) <sup>4</sup> S <sub>3/2</sub>	2p <sup>2</sup> 4s	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2.01[09]	2.01[09]	9.730	1.09[10]	6.12[08]	1163.71	1.66[08]	3.27[-16]

Low level		Upper level		A <sub>a</sub>	ΣA <sub>a</sub>	E <sub>S</sub>	ΣgA <sub>r</sub>	gA <sub>r</sub>	λ	Q <sub>d</sub>	C <sub>S</sub> <sup>eff</sup>
Conf.	LSJ	Conf.	LSJ	s <sup>-1</sup>	s <sup>-1</sup>	eV	s <sup>-1</sup>	s <sup>-1</sup>	Å	s <sup>-1</sup>	cm <sup>3</sup> /s
2s2p4d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	1.70[11]	1.70[11]	6.912	8.19[09]	1.19[08]	1164.67	1.18[08]	3.09[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	1.70[11]	1.70[11]	6.912	8.19[09]	1.69[08]	1165.78	1.67[08]	4.39[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	1.54[09]	1.54[09]	6.903	8.68[09]	5.63[08]	1166.75	3.30[08]	8.65[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	9.54[10]	9.54[10]	6.871	7.51[09]	4.15[08]	1169.21	4.10[08]	1.08[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	2.35[09]	2.35[09]	6.862	6.98[09]	3.46[08]	1171.24	2.52[08]	6.65[-16]
2s2p4s	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.96[11]	1.96[11]	3.703	3.86[10]	2.08[08]	1180.83	2.02[08]	7.29[-16]
2s <sup>2</sup> 7f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> G <sub>9/2</sub>	1.63[14]	1.63[14]	6.258	6.94[10]	4.31[08]	1181.72	4.30[08]	1.21[-15]
2s <sup>2</sup> 7f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.63[14]	1.63[14]	6.257	5.55[10]	3.30[08]	1181.75	3.30[08]	9.23[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> F <sub>1/2</sub>	2.13[11]	2.13[11]	4.134	3.11[10]	6.94[08]	1189.34	6.47[08]	2.24[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	1.54[09]	1.54[09]	6.903	8.68[09]	2.38[08]	1205.68	1.39[08]	3.66[-16]
2s <sup>2</sup> 7p	( <sup>1</sup> S) <sup>2</sup> P <sub>1/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	1.30[11]	1.30[11]	5.756	3.25[10]	1.91[08]	1205.85	1.79[08]	5.28[-16]
2s <sup>2</sup> 7p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	2s2p4f	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	1.43[11]	1.43[11]	5.756	4.82[10]	3.39[08]	1206.00	3.21[08]	9.45[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	4.90[09]	4.90[09]	6.905	6.80[09]	1.37[09]	1208.52	1.21[09]	3.16[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.96[11]	1.96[11]	3.703	3.86[10]	1.70[08]	1209.14	1.65[08]	5.95[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	1.92[11]	1.92[11]	3.697	3.09[10]	1.19[08]	1209.82	1.15[08]	4.14[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	4.62[09]	4.62[09]	6.868	5.31[09]	5.57[08]	1209.85	4.87[08]	1.28[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.69[11]	3.69[11]	3.956	7.14[10]	6.59[08]	1210.34	6.39[08]	2.25[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	2.35[09]	2.35[09]	6.862	6.98[09]	1.76[08]	1210.48	1.29[08]	3.39[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> D <sub>5/2</sub>	5.44[11]	5.44[11]	3.691	8.43[10]	4.02[08]	1210.63	3.92[08]	1.42[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> D <sub>3/2</sub>	5.47[11]	5.47[11]	3.679	5.46[10]	2.53[08]	1212.01	2.47[08]	8.95[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.30[09]	1.30[09]	6.844	4.80[09]	1.80[08]	1212.71	1.23[08]	3.25[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	3.65[11]	3.65[11]	3.930	5.04[10]	4.94[08]	1213.02	4.77[08]	1.69[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> F <sub>7/2</sub>	1.32[10]	1.32[10]	3.632	3.43[11]	1.89[09]	1217.62	4.42[08]	1.61[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2.84[11]	2.84[11]	6.919	5.78[09]	1.03[08]	1218.71	1.02[08]	2.67[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	1.70[11]	1.70[11]	6.912	8.19[09]	5.49[08]	1219.58	5.45[08]	1.43[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2.84[11]	2.84[11]	6.919	5.78[09]	4.75[08]	1220.90	4.72[08]	1.24[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	9.54[10]	9.54[10]	6.871	7.51[09]	2.80[08]	1224.56	2.76[08]	7.27[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p8p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	6.40[11]	6.40[11]	6.769	6.52[09]	3.80[08]	1224.76	3.79[08]	1.01[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p8p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	6.01[11]	6.01[11]	6.741	4.88[09]	2.59[08]	1225.07	2.58[08]	6.89[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p8p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	1.59[13]	1.59[13]	6.856	2.76[09]	1.42[08]	1226.35	1.42[08]	3.74[-16]
2s <sup>2</sup> 8f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p8f	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	4.90[09]	4.90[09]	6.905	6.80[09]	1.58[08]	1228.15	1.39[08]	3.64[-16]
2s <sup>2</sup> 6f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.58[11]	3.58[11]	4.416	9.16[10]	2.78[08]	1230.72	2.66[08]	8.96[-16]
2s2p4s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.69[11]	3.69[11]	3.956	7.14[10]	2.23[08]	1230.99	2.16[08]	7.62[-16]
2s <sup>2</sup> 6f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	3.20[11]	3.20[11]	4.412	6.03[10]	1.95[08]	1231.15	1.86[08]	6.28[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.96[11]	1.96[11]	3.703	3.86[10]	6.78[08]	1241.02	6.57[08]	2.37[-15]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	1.92[11]	1.92[11]	3.697	3.09[10]	3.58[08]	1241.31	3.44[08]	1.24[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	8.15[10]	8.15[10]	5.848	9.77[09]	1.85[08]	1241.46	1.82[08]	5.31[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	1.92[11]	1.92[11]	3.697	3.09[10]	1.99[08]	1241.73	1.92[08]	6.93[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	5.26[11]	5.26[11]	5.858	7.80[09]	1.31[08]	1242.06	1.31[08]	3.81[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> D <sub>5/2</sub>	5.44[11]	5.44[11]	3.691	8.43[10]	1.54[09]	1242.59	1.50[09]	5.42[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	4.89[10]	4.89[10]	5.825	8.97[09]	1.90[08]	1243.06	1.84[08]	5.39[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	8.15[10]	8.15[10]	5.848	9.77[09]	1.04[08]	1243.30	1.02[08]	2.98[-16]
2s2p3d	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> D <sub>3/2</sub>	5.47[11]	5.47[11]	3.679	5.46[10]	1.02[09]	1243.62	9.94[08]	3.60[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	8.15[10]	8.15[10]	5.814	9.77[09]	4.41[08]	1245.77	4.34[08]	1.27[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.94[11]	1.94[11]	5.822	6.98[09]	1.19[08]	1246.54	1.18[08]	3.46[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>4</sup> G <sub>5/2</sub>	4.32[09]	4.32[09]	5.794	5.58[09]	8.90[08]	1247.00	7.32[08]	2.15[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	7.04[10]	7.04[10]	5.796	7.07[09]	7.98[08]	1248.01	7.88[08]	2.31[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>4</sup> G <sub>9/2</sub>	5.38[10]	5.38[10]	5.809	8.58[09]	1.25[09]	1248.14	1.23[09]	3.60[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.99[10]	1.99[10]	5.860	6.01[09]	1.94[08]	1261.21	1.85[08]	5.38[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	8.15[10]	8.15[10]	5.848	9.77[09]	1.68[08]	1262.70	1.65[08]	4.82[-16]
2s2p4s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> D <sub>3/2</sub>	5.47[11]	5.47[11]	3.679	5.46[10]	1.64[08]	1262.71	1.60[08]	5.80[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p7f	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	3.80[10]	3.80[10]	5.855	9.52[09]	3.04[08]	1263.22	2.95[08]	8.59[-16]
2s2p4s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	1.92[11]	1.92[11]	3.697	3.09[10]	2.34[08]	1263.47	2.25[08]	8.13[-16]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_{Sf}^{\text{eff}}$
Conf.	$LSJ$	Conf.	$LSJ$	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	$\text{\AA}$	$s^{-1}$	$\text{cm}^3/s$
$2s2p4s$	$(^3P) ^2P_{3/2}$	$2p^23d$	$(^1D) ^2D_{5/2}$	5.44[11]	5.44[11]	3.691	8.43[10]	1.17[08]	1264.36	1.14[08]	4.12[-16]
$2s2p4d$	$(^3P) ^4D_{7/2}$	$2s2p7f$	$(^3P) ^4F_{9/2}$	1.38[08]	1.38[08]	5.845	8.72[09]	1.01[09]	1264.52	1.37[08]	4.01[-16]
$2s2p3d$	$(^1P) ^2P_{1/2}$	$2s2p4p$	$(^1P) ^2S_{1/2}$	1.54[14]	1.54[14]	4.325	9.31[09]	2.20[08]	1265.39	2.20[08]	7.46[-16]
$2s2p3d$	$(^1P) ^2P_{3/2}$	$2s2p4p$	$(^1P) ^2S_{1/2}$	1.54[14]	1.54[14]	4.325	9.31[09]	4.84[08]	1265.66	4.84[08]	1.64[-15]
$2s2p4d$	$(^3P) ^4D_{5/2}$	$2s2p7f$	$(^3P) ^2G_{7/2}$	1.94[11]	1.94[11]	5.822	6.98[09]	4.96[08]	1266.05	4.94[08]	1.44[-15]
$2s2p4d$	$(^3P) ^4D_{1/2}$	$2s2p7f$	$(^3P) ^4F_{3/2}$	9.53[09]	9.53[09]	5.813	3.91[09]	4.80[08]	1266.12	4.35[08]	1.27[-15]
$2s2p4d$	$(^3P) ^4D_{3/2}$	$2s2p7f$	$(^3P) ^4F_{3/2}$	9.53[09]	9.53[09]	5.813	3.91[09]	1.41[08]	1266.51	1.28[08]	3.75[-16]
$2s2p4d$	$(^3P) ^4D_{3/2}$	$2s2p7f$	$(^3P) ^4G_{5/2}$	4.32[09]	4.32[09]	5.794	5.58[09]	1.40[08]	1268.98	1.15[08]	3.38[-16]
$2s2p4d$	$(^3P) ^4D_{7/2}$	$2s2p7f$	$(^3P) ^4G_{9/2}$	5.38[10]	5.38[10]	5.809	8.58[09]	5.63[08]	1269.14	5.54[08]	1.62[-15]
$2s2p4d$	$(^3P) ^4D_{5/2}$	$2s2p7f$	$(^3P) ^4G_{7/2}$	7.04[10]	7.04[10]	5.796	7.07[09]	4.42[08]	1269.48	4.37[08]	1.28[-15]
$2s2p4d$	$(^3P) ^4P_{5/2}$	$2s2p7f$	$(^3P) ^4D_{5/2}$	1.99[10]	1.99[10]	5.860	6.01[09]	2.92[08]	1278.23	2.78[08]	8.10[-16]
$2s2p4d$	$(^3P) ^4P_{5/2}$	$2s2p7f$	$(^3P) ^4D_{7/2}$	3.80[10]	3.80[10]	5.855	9.52[09]	7.58[08]	1278.82	7.35[08]	2.14[-15]
$2s2p4d$	$(^3P) ^4P_{3/2}$	$2s2p7f$	$(^3P) ^4D_{3/2}$	4.66[09]	4.66[09]	5.865	3.88[09]	3.73[08]	1279.37	3.09[08]	9.00[-16]
$2s2p4d$	$(^3P) ^4P_{3/2}$	$2s2p7f$	$(^3P) ^4D_{5/2}$	1.99[10]	1.99[10]	5.860	6.01[09]	5.35[08]	1280.13	5.09[08]	1.48[-15]
$2s2p4d$	$(^3P) ^4P_{1/2}$	$2s2p7f$	$(^3P) ^4D_{3/2}$	4.66[09]	4.66[09]	5.865	3.88[09]	2.61[08]	1280.39	2.16[08]	6.29[-16]
$2s2p4d$	$(^3P) ^2D_{3/2}$	$2s2p4f$	$(^1P) ^2F_{5/2}$	4.16[09]	4.16[09]	5.938	5.62[10]	1.25[09]	1281.99	3.83[08]	1.11[-15]
$2s2p4d$	$(^3P) ^4P_{5/2}$	$2s2p7f$	$(^3P) ^2G_{7/2}$	1.94[11]	1.94[11]	5.822	6.98[09]	2.65[08]	1283.19	2.63[08]	7.70[-16]
$2s2p4d$	$(^3P) ^2D_{5/2}$	$2s2p4f$	$(^1P) ^2F_{7/2}$	8.81[09]	8.81[09]	5.938	7.48[10]	1.86[09]	1283.28	9.01[08]	2.60[-15]
$2s2p4d$	$(^3P) ^4P_{5/2}$	$2s2p7f$	$(^3P) ^2F_{7/2}$	8.15[10]	8.15[10]	5.814	9.77[09]	1.21[08]	1284.33	1.20[08]	3.50[-16]
$2s2p3d$	$(^1P) ^2F_{7/2}$	$2p^23d$	$(^1D) ^2G_{9/2}$	4.28[13]	4.28[13]	3.091	3.77[09]	2.60[08]	1285.84	2.60[08]	1.00[-15]
$2s2p3d$	$(^1P) ^2F_{5/2}$	$2p^23d$	$(^1D) ^2G_{7/2}$	4.27[13]	4.27[13]	3.090	3.06[09]	2.05[08]	1286.01	2.05[08]	7.88[-16]
$2s2p4d$	$(^3P) ^2F_{5/2}$	$2s2p4f$	$(^1P) ^2G_{7/2}$	1.63[14]	1.63[14]	6.257	5.55[10]	1.33[08]	1286.48	1.33[08]	3.71[-16]
$2s2p4d$	$(^3P) ^4F_{7/2}$	$2s2p7p$	$(^3P) ^4D_{5/2}$	5.69[09]	5.69[09]	5.509	1.52[09]	1.05[08]	1287.04	1.00[08]	3.03[-16]
$2s2p4d$	$(^3P) ^2D_{3/2}$	$2s2p7f$	$(^3P) ^2D_{3/2}$	3.44[11]	3.44[11]	5.888	5.80[09]	1.01[08]	1288.57	1.00[08]	2.91[-16]
$2s2p4d$	$(^3P) ^2F_{7/2}$	$2s2p4f$	$(^1P) ^2G_{9/2}$	1.63[14]	1.63[14]	6.258	6.94[10]	1.56[08]	1289.89	1.56[08]	4.37[-16]
$2s2p3d$	$(^1P) ^2P_{1/2}$	$2s2p4p$	$(^1P) ^2P_{1/2}$	2.13[11]	2.13[11]	4.134	3.11[10]	3.62[08]	1290.61	3.37[08]	1.17[-15]
$2s2p3d$	$(^1P) ^2P_{3/2}$	$2s2p4p$	$(^1P) ^2P_{1/2}$	2.13[11]	2.13[11]	4.134	3.11[10]	1.38[08]	1290.89	1.29[08]	4.47[-16]
$2s2p4d$	$(^3P) ^2D_{5/2}$	$2s2p7f$	$(^3P) ^2D_{5/2}$	2.65[11]	2.65[11]	5.875	1.04[10]	1.58[08]	1291.79	1.57[08]	4.57[-16]
$2s2p4d$	$(^3P) ^2D_{5/2}$	$2s2p7f$	$(^3P) ^2F_{7/2}$	8.15[10]	8.15[10]	5.848	9.77[09]	1.29[08]	1295.37	1.27[08]	3.71[-16]
$2s2p4d$	$(^3P) ^2D_{3/2}$	$2s2p7f$	$(^3P) ^2F_{5/2}$	4.89[10]	4.89[10]	5.825	8.97[09]	3.02[08]	1297.10	2.93[08]	8.56[-16]
$2s2p4d$	$(^3P) ^4D_{7/2}$	$2s2p7p$	$(^3P) ^4P_{5/2}$	6.20[09]	6.20[09]	5.593	1.26[09]	1.16[08]	1297.88	1.12[08]	3.36[-16]
$2s2p4d$	$(^3P) ^2D_{5/2}$	$2s2p7f$	$(^3P) ^2F_{7/2}$	8.15[10]	8.15[10]	5.814	9.77[09]	2.91[08]	1300.06	2.86[08]	8.38[-16]
$2s2p3d$	$(^1P) ^2P_{1/2}$	$2s2p6p$	$(^3P) ^2S_{1/2}$	3.79[13]	3.79[13]	3.929	1.91[10]	2.44[08]	1318.67	2.44[08]	8.63[-16]
$2s2p3d$	$(^1P) ^2P_{3/2}$	$2s2p6p$	$(^3P) ^2S_{1/2}$	3.79[13]	3.79[13]	3.929	1.91[10]	5.49[08]	1318.97	5.49[08]	1.94[-15]
$2s^26f$	$(^1S) ^2F_{7/2}$	$2p^23d$	$(^1D) ^2D_{5/2}$	5.44[11]	5.44[11]	3.691	8.43[10]	1.59[08]	1326.21	1.55[08]	5.61[-16]
$2s^26f$	$(^1S) ^2F_{7/2}$	$2p^23d$	$(^1D) ^2F_{7/2}$	1.32[10]	1.32[10]	3.632	3.43[11]	5.38[08]	1334.61	1.26[08]	4.59[-16]
$2s2p4d$	$(^3P) ^2D_{5/2}$	$2s2p7p$	$(^3P) ^2P_{3/2}$	2.60[10]	2.60[10]	5.552	1.36[10]	1.15[08]	1336.73	1.02[08]	3.06[-16]
$2s2p4d$	$(^3P) ^2F_{5/2}$	$2s2p7f$	$(^3P) ^2F_{7/2}$	8.15[10]	8.15[10]	5.848	9.77[09]	3.23[08]	1343.54	3.18[08]	9.28[-16]
$2s2p4d$	$(^3P) ^2F_{7/2}$	$2s2p7f$	$(^3P) ^2G_{9/2}$	5.26[11]	5.26[11]	5.858	7.80[09]	1.76[09]	1345.88	1.75[09]	5.11[-15]
$2s2p4d$	$(^3P) ^2F_{5/2}$	$2s2p7f$	$(^3P) ^2G_{7/2}$	1.94[11]	1.94[11]	5.822	6.98[09]	5.81[08]	1347.33	5.79[08]	1.69[-15]
$2s2p4d$	$(^3P) ^2F_{7/2}$	$2s2p7f$	$(^3P) ^2F_{7/2}$	8.15[10]	8.15[10]	5.848	9.77[09]	1.05[08]	1347.34	1.03[08]	3.01[-16]
$2s2p4d$	$(^3P) ^2F_{5/2}$	$2s2p7f$	$(^3P) ^2F_{7/2}$	8.15[10]	8.15[10]	5.814	9.77[09]	3.04[08]	1348.59	2.99[08]	8.75[-16]
$2s2p4d$	$(^3P) ^2F_{5/2}$	$2s2p7f$	$(^3P) ^4G_{7/2}$	7.04[10]	7.04[10]	5.796	7.07[09]	2.06[08]	1351.22	2.04[08]	5.97[-16]
$2s2p4d$	$(^3P) ^2F_{7/2}$	$2s2p7f$	$(^3P) ^4G_{9/2}$	5.38[10]	5.38[10]	5.809	8.58[09]	1.56[08]	1353.03	1.53[08]	4.48[-16]
$2s2p3d$	$(^1P) ^2P_{3/2}$	$2p^23d$	$(^1D) ^2D_{5/2}$	5.44[11]	5.44[11]	3.691	8.43[10]	1.07[08]	1353.37	1.05[08]	3.78[-16]
$2s2p4d$	$(^3P) ^2P_{3/2}$	$2s2p7f$	$(^3P) ^2D_{3/2}$	3.44[11]	3.44[11]	5.888	5.80[09]	1.22[08]	1356.12	1.22[08]	3.54[-16]
$2s2p4d$	$(^3P) ^2P_{3/2}$	$2s2p7f$	$(^3P) ^2D_{5/2}$	2.65[11]	2.65[11]	5.875	1.04[10]	8.10[08]	1358.19	8.05[08]	2.34[-15]
$2s2p4d$	$(^3P) ^2P_{1/2}$	$2s2p7f$	$(^3P) ^2D_{3/2}$	3.44[11]	3.44[11]	5.888	5.80[09]	5.67[08]	1358.84	5.64[08]	1.64[-15]
$2s2p4d$	$(^3P) ^2P_{3/2}$	$2s2p7f$	$(^3P) ^2F_{5/2}$	4.89[10]	4.89[10]	5.825	8.97[09]	1.45[08]	1365.57	1.41[08]	4.11[-16]
$2s^28f$	$(^1S) ^2F_{7/2}$	$2s2p7f$	$(^3P) ^2G_{9/2}$	5.26[11]	5.26[11]	5.858	7.80[09]	1.86[08]	1370.26	1.86[08]	5.42[-16]
$2s2p4d$	$(^3P) ^2F_{7/2}$	$2s2p7p$	$(^3P) ^2D_{5/2}$	8.74[11]	8.74[11]	5.659	1.81[10]	3.13[08]	1375.58	3.11[08]	9.26[-16]
$2s2p4d$	$(^3P) ^2F_{5/2}$	$2s2p7p$	$(^3P) ^2D_{3/2}$	8.67[11]	8.67[11]	5.630	1.23[10]	2.20[08]	1376.10	2.19[08]	6.53[-16]
$2s^26f$	$(^1S) ^2F_{7/2}$	$2p^23d$	$(^1D) ^2G_{9/2}$	4.28[13]	4.28[13]	3.091	3.77[09]	1.64[08]	1417.01	1.64[08]	6.31[-16]

Low level		Upper level		A <sub>a</sub>	ΣA <sub>a</sub>	E <sub>S</sub>	ΣgA <sub>r</sub>	gA <sub>r</sub>	λ	Q <sub>d</sub>	C <sub>S</sub> <sup>eff</sup>
Conf.	LSJ	Conf.	LSJ	s <sup>-1</sup>	s <sup>-1</sup>	eV	s <sup>-1</sup>	s <sup>-1</sup>	Å	s <sup>-1</sup>	cm <sup>3</sup> /s
2s <sup>2</sup> 6f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>1</sup> D) <sup>2</sup> G <sub>7/2</sub>	4.27[13]	4.27[13]	3.090	3.06[09]	1.29[08]	1417.20	1.29[08]	4.95[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	3.91[11]	3.91[11]	4.247	1.16[10]	1.22[08]	1481.08	1.22[08]	4.17[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	7.84[09]	7.84[09]	4.232	1.49[10]	6.60[08]	1483.82	5.55[08]	1.90[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	3.68[11]	3.68[11]	4.216	1.11[10]	2.10[08]	1484.04	2.09[08]	7.17[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.03[09]	1.03[09]	4.215	1.28[10]	3.05[08]	1484.24	1.20[08]	4.11[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	4.29[09]	4.29[09]	4.209	9.58[09]	2.66[08]	1485.13	1.94[08]	6.67[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.03[09]	1.03[09]	4.215	1.28[10]	4.29[08]	1486.87	1.68[08]	5.79[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	7.84[09]	7.84[09]	4.232	1.49[10]	6.21[08]	1487.47	5.22[08]	1.79[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> G <sub>5/2</sub>	7.69[08]	7.69[08]	4.178	8.46[09]	1.82[09]	1488.92	6.42[08]	2.21[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	4.60[10]	4.60[10]	4.182	1.10[10]	2.04[09]	1490.09	1.98[09]	6.83[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> G <sub>9/2</sub>	4.38[10]	4.38[10]	4.194	1.39[10]	2.61[09]	1490.47	2.53[09]	8.71[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2.69[09]	2.69[09]	4.262	9.55[09]	2.68[08]	1505.88	1.68[08]	5.75[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	3.91[11]	3.91[11]	4.247	1.16[10]	1.29[08]	1510.75	1.29[08]	4.42[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	7.84[09]	7.84[09]	4.232	1.49[10]	2.01[09]	1513.59	1.69[09]	5.78[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	4.29[09]	4.29[09]	4.209	9.58[09]	1.22[09]	1514.57	8.86[08]	3.05[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.03[09]	1.03[09]	4.215	1.28[10]	1.52[09]	1514.70	5.98[08]	2.05[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>1/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	6.96[09]	6.96[09]	4.206	6.43[09]	8.33[08]	1514.71	6.77[08]	2.33[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	6.96[09]	6.96[09]	4.206	6.43[09]	2.69[08]	1515.26	2.19[08]	7.51[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	4.29[09]	4.29[09]	4.209	9.58[09]	2.32[08]	1515.63	1.69[08]	5.82[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> G <sub>9/2</sub>	4.38[10]	4.38[10]	4.194	1.39[10]	6.12[08]	1520.51	5.93[08]	2.04[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	4.60[10]	4.60[10]	4.182	1.10[10]	3.88[08]	1520.79	3.77[08]	1.30[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2.69[09]	2.69[09]	4.262	9.55[09]	5.63[08]	1530.20	3.54[08]	1.21[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	1.38[09]	1.38[09]	4.269	6.30[09]	6.40[08]	1531.67	2.99[08]	1.02[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	3.00[08]	3.00[08]	4.252	1.32[10]	1.80[09]	1532.19	2.77[08]	9.46[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2.69[09]	2.69[09]	4.262	9.55[09]	1.06[09]	1532.92	6.65[08]	2.27[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	1.38[09]	1.38[09]	4.269	6.30[09]	4.49[08]	1533.14	2.10[08]	7.16[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	6.82[11]	6.82[11]	4.328	1.43[10]	1.64[08]	1537.94	1.63[08]	5.53[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.02[11]	3.02[11]	4.328	3.70[10]	5.26[08]	1538.09	5.15[08]	1.75[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.03[09]	1.03[09]	4.215	1.28[10]	3.58[08]	1539.31	1.40[08]	4.82[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.02[11]	3.02[11]	4.328	3.70[10]	3.45[08]	1540.02	3.38[08]	1.15[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2.07[10]	2.07[10]	4.319	6.67[10]	2.08[09]	1541.76	1.49[09]	5.05[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.02[11]	3.02[11]	4.291	3.70[10]	1.01[09]	1545.06	9.90[08]	3.37[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.96[11]	1.96[11]	3.703	3.86[10]	1.73[08]	1584.01	1.68[08]	6.06[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	7.29[09]	7.29[09]	3.680	4.88[09]	1.21[08]	1585.67	1.04[08]	3.77[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2.07[10]	2.07[10]	4.319	6.67[10]	2.70[08]	1615.94	1.93[08]	6.54[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.02[11]	3.02[11]	4.291	3.70[10]	1.06[08]	1616.21	1.04[08]	3.53[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.58[11]	3.58[11]	4.416	9.16[10]	1.26[08]	1616.51	1.21[08]	4.07[-16]
2s2p4s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.48[10]	1.48[10]	0.822	7.31[09]	1.85[08]	1627.43	1.71[08]	8.24[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	3.91[11]	3.91[11]	4.247	1.16[10]	2.84[09]	1631.13	2.83[09]	9.70[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	3.68[11]	3.68[11]	4.216	1.11[10]	2.19[09]	1632.29	2.18[09]	7.48[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	6.82[11]	6.82[11]	4.328	1.43[10]	1.79[08]	1635.15	1.78[08]	6.06[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.02[11]	3.02[11]	4.328	3.70[10]	8.00[08]	1635.33	7.84[08]	2.66[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	6.82[11]	6.82[11]	4.328	1.43[10]	8.35[08]	1639.10	8.30[08]	2.82[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	4.60[10]	4.60[10]	4.182	1.10[10]	2.04[08]	1639.62	1.98[08]	6.84[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> G <sub>9/2</sub>	4.38[10]	4.38[10]	4.194	1.39[10]	2.04[08]	1642.52	1.98[08]	6.80[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.02[11]	3.02[11]	4.291	3.70[10]	7.10[08]	1643.20	6.96[08]	2.37[-15]
2s <sup>2</sup> 8f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	3.91[11]	3.91[11]	4.247	1.16[10]	2.98[08]	1667.08	2.97[08]	1.02[-15]
2s <sup>2</sup> 8f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	3.68[11]	3.68[11]	4.216	1.11[10]	1.64[08]	1673.56	1.64[08]	5.62[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	3.65[11]	3.65[11]	3.930	5.04[10]	1.84[08]	1695.99	1.78[08]	6.28[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.69[11]	3.69[11]	3.956	7.14[10]	2.62[08]	1696.00	2.54[08]	8.95[-16]
2s <sup>2</sup> 3p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	4.29[09]	4.29[09]	4.209	9.58[09]	1.62[08]	1742.65	1.18[08]	4.06[-16]
2s <sup>2</sup> 3p	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	7.84[09]	7.84[09]	4.232	1.49[10]	2.50[08]	1747.35	2.10[08]	7.19[-16]
2s2p4s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	4.70[12]	4.70[12]	0.953	2.90[10]	2.66[08]	1754.07	2.66[08]	1.27[-15]



Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{\text{eff}}$
Conf.	$LSJ$	Conf.	$LSJ$	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	Å	$s^{-1}$	$\text{cm}^3/\text{s}$
2s2p4s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	4.45[12]	4.45[12]	0.926	2.01[10]	1.06[08]	1754.72	1.06[08]	5.04[-16]
2s <sup>2</sup> 3p	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p6f	( <sup>3</sup> P) <sup>4</sup> G <sub>9/2</sub>	4.38[10]	4.38[10]	4.194	1.39[10]	1.15[08]	1756.59	1.12[08]	3.85[-16]
2s <sup>2</sup> 3p	( <sup>3</sup> P) <sup>2</sup> F <sub>3/2</sub>	2s2p7p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	3.80[12]	3.80[12]	5.751	1.70[10]	1.12[08]	1791.04	1.12[08]	3.29[-16]
2s <sup>2</sup> 3p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.58[11]	3.58[11]	4.416	9.16[10]	1.49[08]	1965.77	1.43[08]	4.82[-16]
2s <sup>2</sup> 3p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p4p	( <sup>1</sup> P) <sup>2</sup> F <sub>1/2</sub>	2.13[11]	2.13[11]	4.134	3.11[10]	1.34[08]	2046.17	1.25[08]	4.31[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	6.10[11]	6.10[11]	2.761	1.66[11]	1.33[08]	2061.26	1.28[08]	5.06[-16]
2s <sup>2</sup> 3p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p6p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.69[11]	3.69[11]	3.956	7.14[10]	1.12[08]	2120.24	1.09[08]	3.83[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	8.39[09]	8.39[09]	1.555	1.87[10]	3.77[08]	2183.10	3.08[08]	1.38[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.36[10]	1.36[10]	1.527	1.51[10]	4.85[08]	2188.14	4.26[08]	1.91[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	2.89[08]	2.89[08]	1.498	1.78[10]	3.97[09]	2199.52	4.58[08]	2.06[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>1/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2.25[09]	2.25[09]	1.653	1.37[10]	1.13[09]	2201.37	4.49[08]	1.99[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	9.80[08]	9.80[08]	1.655	2.05[10]	1.83[09]	2201.53	4.06[08]	1.80[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2.25[09]	2.25[09]	1.653	1.37[10]	4.30[08]	2202.52	1.70[08]	7.56[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	9.80[08]	9.80[08]	1.655	2.05[10]	5.29[08]	2203.77	1.18[08]	5.22[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	1.14[09]	1.14[09]	1.891	3.41[10]	2.13[09]	2208.22	4.50[08]	1.95[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	1.48[09]	1.48[09]	1.872	2.52[10]	1.52[09]	2211.86	3.94[08]	1.71[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2.84[08]	2.84[08]	1.757	2.03[10]	1.43[09]	2220.70	1.11[08]	4.87[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	9.64[11]	9.64[11]	1.400	2.27[10]	3.37[08]	2415.34	3.35[08]	1.52[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	8.59[11]	8.59[11]	1.385	3.33[10]	5.64[08]	2427.13	5.60[08]	2.55[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.48[10]	1.48[10]	0.822	7.31[09]	1.58[08]	2506.85	1.46[08]	7.02[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	8.39[09]	8.39[09]	1.555	1.87[10]	5.49[09]	2525.54	4.49[09]	2.01[-14]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.36[10]	1.36[10]	1.527	1.51[10]	4.17[09]	2526.48	3.66[09]	1.64[-14]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.36[10]	1.36[10]	1.527	1.51[10]	1.45[08]	2539.93	1.27[08]	5.71[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.48[10]	1.48[10]	0.822	7.31[09]	1.31[08]	2583.92	1.21[08]	5.85[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.48[10]	1.48[10]	0.822	7.31[09]	2.06[08]	2587.00	1.90[08]	9.16[-16]
2s <sup>2</sup> 8f	( <sup>1</sup> S) <sup>2</sup> F <sub>7/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	8.39[09]	8.39[09]	1.555	1.87[10]	6.25[08]	2612.78	5.11[08]	2.29[-15]
2s <sup>2</sup> 8f	( <sup>1</sup> S) <sup>2</sup> F <sub>5/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.36[10]	1.36[10]	1.527	1.51[10]	3.41[08]	2626.74	2.99[08]	1.34[-15]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	7.30[09]	7.30[09]	0.753	4.34[10]	4.49[08]	2630.75	2.25[08]	1.09[-15]
2s <sup>2</sup> 3p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	6.22[11]	6.22[11]	2.758	1.09[11]	1.40[08]	2647.14	1.34[08]	5.32[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.48[10]	1.48[10]	0.822	7.31[09]	2.06[08]	2659.62	1.91[08]	9.19[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	9.64[11]	9.64[11]	1.400	2.27[10]	3.44[08]	2664.09	3.41[08]	1.55[-15]
2s <sup>2</sup> 3p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	6.10[11]	6.10[11]	2.761	1.66[11]	2.08[08]	2665.05	1.99[08]	7.90[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.48[10]	1.48[10]	0.822	7.31[09]	2.70[08]	2667.86	2.50[08]	1.20[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	8.59[11]	8.59[11]	1.385	3.33[10]	2.78[09]	2672.60	2.76[09]	1.26[-14]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	9.64[11]	9.64[11]	1.400	2.27[10]	1.57[09]	2674.58	1.56[09]	7.10[-15]
2s <sup>2</sup> 3p	( <sup>3</sup> P) <sup>4</sup> D <sub>1/2</sub>	2s2p5f	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2.25[09]	2.25[09]	1.653	1.37[10]	2.78[08]	2714.18	1.10[08]	4.87[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	5.75[08]	5.75[08]	0.416	9.16[09]	4.47[08]	2730.68	1.22[08]	6.13[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	9.99[08]	9.99[08]	0.806	6.41[10]	1.90[09]	2737.48	2.11[08]	1.02[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2.37[09]	2.37[09]	0.786	5.39[10]	1.51[09]	2743.57	3.16[08]	1.53[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	1.06[13]	1.06[13]	1.069	1.06[10]	1.98[08]	2867.91	1.98[08]	9.30[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	4.70[12]	4.70[12]	0.953	2.90[10]	6.49[08]	2878.77	6.48[08]	3.08[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	4.45[12]	4.45[12]	0.926	2.01[10]	4.46[08]	2879.48	4.45[08]	2.12[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	1.06[13]	1.06[13]	1.069	1.06[10]	1.12[08]	2880.08	1.12[08]	5.27[-16]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	4.70[12]	4.70[12]	0.953	2.90[10]	2.45[08]	2947.20	2.45[08]	1.17[-15]
2s2p4d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	4.45[12]	4.45[12]	0.926	2.01[10]	1.31[08]	2979.30	1.31[08]	6.26[-16]
2s2p4d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	8.02[08]	8.02[08]	0.129	1.89[10]	1.53[09]	3032.27	4.56[08]	2.36[-15]
2s <sup>2</sup> 3p	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	6.22[11]	6.22[11]	2.758	1.09[11]	2.47[08]	3151.98	2.36[08]	9.38[-16]
2s <sup>2</sup> 3p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	6.10[11]	6.10[11]	2.761	1.66[11]	4.53[08]	3152.60	4.34[08]	1.72[-15]
2s <sup>2</sup> 3p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	4.70[12]	4.70[12]	0.953	2.90[10]	1.03[08]	5835.55	1.03[08]	4.89[-16]

Table IX: Autoionization rates ( $A_a$  in  $s^{-1}$ ) and excitation energies ( $E_S$  in eV) for odd-parity states. Wavelengths ( $\lambda$  in Å), weighted radiative rates ( $gA_r$  in  $s^{-1}$ ), factor intensities ( $Q_d$  in  $s^{-1}$ ) and effective emission rate coefficients ( $C_S^{\text{eff}}$  in  $\text{cm}^3/\text{s}$ ) for transitions between even- and odd-parity states of B-like oxygen.

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{\text{eff}}$
Conf.	<i>LSJ</i>	Conf.	<i>LSJ</i>	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	Å	$s^{-1}$	$\text{cm}^3/\text{s}$
$2s2p^2$	$(^1D)^2D_{3/2}$	$2p^28p$	$(^1D)^2F_{5/2}$	1.08[11]	1.34[12]	25.737	7.72[09]	1.91[09]	141.81	1.54[08]	6.14[-17]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2p^28p$	$(^1D)^2F_{7/2}$	1.08[11]	1.34[12]	25.737	1.03[10]	2.70[09]	141.81	2.17[08]	8.68[-17]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2p^27p$	$(^1D)^2F_{5/2}$	2.16[11]	2.40[12]	24.591	8.57[09]	2.85[09]	143.69	2.56[08]	1.14[-16]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2p^27p$	$(^1D)^2F_{7/2}$	2.16[11]	2.40[12]	24.592	1.14[10]	4.03[09]	143.69	3.62[08]	1.62[-16]
$2s2p^2$	$(^3P)^4F_{5/2}$	$2p^25p$	$(^3P)^4D_{7/2}$	3.12[08]	1.50[09]	16.922	3.30[10]	8.03[09]	145.38	4.46[08]	4.30[-16]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2p^26p$	$(^1D)^2F_{5/2}$	5.13[11]	5.28[12]	22.798	1.10[10]	4.27[09]	146.74	4.14[08]	2.22[-16]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2p^26p$	$(^1D)^2F_{7/2}$	5.12[11]	5.28[12]	22.799	1.46[10]	6.04[09]	146.74	5.86[08]	3.14[-16]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2p^25p$	$(^1D)^2F_{7/2}$	1.59[12]	1.54[13]	19.758	1.99[10]	9.52[09]	152.22	9.81[08]	7.12[-16]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2p^25p$	$(^1D)^2F_{5/2}$	1.58[12]	1.54[13]	19.756	1.49[10]	6.84[09]	152.23	7.05[08]	5.12[-16]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2s2p8d$	$(^1P)^2P_{1/2}$	2.58[13]	3.36[13]	16.201	1.46[10]	1.95[08]	159.17	1.50[08]	1.55[-16]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2s2p8d$	$(^1P)^2P_{3/2}$	2.58[13]	3.36[13]	16.201	2.91[10]	3.48[08]	159.17	2.67[08]	2.77[-16]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2s2p8d$	$(^1P)^2F_{5/2}$	1.58[13]	2.04[13]	16.168	2.43[10]	4.96[09]	159.24	3.84[09]	3.99[-15]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2s2p8d$	$(^1P)^2F_{7/2}$	1.58[13]	2.03[13]	16.168	3.23[10]	6.99[09]	159.24	5.43[09]	5.65[-15]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2s2p8d$	$(^1P)^2F_{5/2}$	1.58[13]	2.04[13]	16.168	2.43[10]	3.52[08]	159.24	2.73[08]	2.84[-16]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2s2p7d$	$(^1P)^2P_{3/2}$	3.71[13]	5.11[13]	15.141	2.67[10]	1.83[08]	161.37	1.33[08]	1.53[-16]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2s2p7d$	$(^1P)^2F_{5/2}$	2.90[13]	3.68[13]	15.093	2.63[10]	6.57[09]	161.47	5.18[09]	5.99[-15]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2s2p7d$	$(^1P)^2F_{7/2}$	2.89[13]	3.66[13]	15.093	3.50[10]	9.28[09]	161.47	7.32[09]	8.47[-15]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2s2p7d$	$(^1P)^2F_{5/2}$	2.90[13]	3.68[13]	15.093	2.63[10]	4.70[08]	161.47	3.70[08]	4.28[-16]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2s2p7s$	$(^1P)^2P_{3/2}$	1.81[13]	8.20[13]	14.779	1.29[10]	1.47[09]	162.13	3.23[08]	3.86[-16]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2s2p7s$	$(^1P)^2P_{1/2}$	1.84[13]	7.99[13]	14.776	6.43[09]	7.91[08]	162.14	1.82[08]	2.18[-16]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2p^24p$	$(^1D)^2P_{3/2}$	1.54[12]	1.08[14]	14.386	1.87[10]	8.39[09]	162.97	1.19[08]	1.48[-16]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2p^24p$	$(^1D)^2F_{7/2}$	1.19[13]	3.45[13]	13.963	2.34[10]	1.14[10]	163.88	3.94[09]	5.10[-15]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2p^24p$	$(^1D)^2F_{5/2}$	1.20[13]	3.46[13]	13.960	1.75[10]	7.98[09]	163.89	2.77[09]	3.59[-15]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2p^24p$	$(^1D)^2F_{5/2}$	1.20[13]	3.46[13]	13.960	1.75[10]	4.82[08]	163.89	1.67[08]	2.17[-16]
$2s2p^2$	$(^3P)^4F_{5/2}$	$2s2p8d$	$(^3P)^2F_{7/2}$	6.17[12]	6.17[12]	6.920	4.74[10]	1.07[08]	164.69	1.07[08]	2.81[-16]
$2s2p^2$	$(^3P)^4P_{3/2}$	$2s2p8d$	$(^3P)^4P_{3/2}$	3.62[09]	3.62[09]	6.848	7.91[09]	3.19[09]	164.79	2.06[09]	5.44[-15]
$2s2p^2$	$(^3P)^4P_{3/2}$	$2s2p8d$	$(^3P)^4P_{1/2}$	3.06[08]	3.06[08]	6.850	3.57[09]	2.64[09]	164.79	3.85[08]	1.02[-15]
$2s2p^2$	$(^3P)^4P_{3/2}$	$2s2p8d$	$(^3P)^4D_{5/2}$	8.58[10]	8.58[10]	6.843	1.38[10]	2.14[09]	164.80	2.08[09]	5.50[-15]
$2s2p^2$	$(^3P)^4P_{1/2}$	$2s2p8d$	$(^3P)^4D_{3/2}$	5.78[09]	5.78[09]	6.808	9.38[09]	5.11[09]	164.84	3.63[09]	9.63[-15]
$2s2p^2$	$(^3P)^4P_{1/2}$	$2s2p8d$	$(^3P)^4D_{1/2}$	1.53[10]	1.53[10]	6.810	5.43[09]	3.88[09]	164.84	3.29[09]	8.72[-15]
$2s2p^2$	$(^3P)^4F_{5/2}$	$2s2p8d$	$(^3P)^2D_{5/2}$	6.77[11]	6.77[11]	6.848	1.51[10]	2.01[09]	164.85	2.01[09]	5.29[-15]
$2s2p^2$	$(^3P)^4F_{5/2}$	$2s2p8d$	$(^3P)^4P_{3/2}$	3.62[09]	3.62[09]	6.848	7.91[09]	2.64[09]	164.85	1.70[09]	4.50[-15]
$2s2p^2$	$(^3P)^4F_{5/2}$	$2s2p8d$	$(^3P)^4D_{5/2}$	8.58[10]	8.58[10]	6.843	1.38[10]	6.53[09]	164.86	6.36[09]	1.68[-14]
$2s2p^2$	$(^3P)^4F_{5/2}$	$2s2p8d$	$(^3P)^4D_{7/2}$	1.25[10]	1.25[10]	6.837	1.79[10]	1.39[10]	164.87	1.18[10]	3.11[-14]
$2s2p^2$	$(^3P)^4P_{3/2}$	$2s2p8d$	$(^3P)^4D_{1/2}$	1.53[10]	1.53[10]	6.810	5.43[09]	1.86[08]	164.87	1.58[08]	4.18[-16]
$2s2p^2$	$(^3P)^4P_{3/2}$	$2s2p8d$	$(^3P)^4D_{3/2}$	5.78[09]	5.78[09]	6.808	9.38[09]	1.71[09]	164.88	1.22[09]	3.23[-15]
$2s2p^2$	$(^3P)^4P_{3/2}$	$2s2p8d$	$(^3P)^4F_{5/2}$	8.35[09]	8.35[09]	6.805	1.08[10]	6.83[09]	164.89	5.62[09]	1.49[-14]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2s2p6d$	$(^1P)^2P_{1/2}$	4.66[13]	6.20[13]	13.498	1.59[10]	3.67[08]	164.90	2.76[08]	3.74[-16]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2s2p6d$	$(^1P)^2P_{3/2}$	4.66[13]	6.20[13]	13.498	3.18[10]	6.51[08]	164.90	4.90[08]	6.64[-16]
$2s2p^2$	$(^3P)^4P_{1/2}$	$2s2p8d$	$(^3P)^4F_{3/2}$	1.16[09]	1.16[09]	6.774	1.59[09]	3.07[08]	164.92	2.29[08]	6.08[-16]
$2s2p^2$	$(^3P)^4P_{3/2}$	$2s2p8d$	$(^3P)^4F_{5/2}$	5.83[10]	5.83[10]	6.781	4.12[09]	2.20[09]	164.94	2.17[09]	5.76[-15]
$2s2p^2$	$(^3P)^4F_{5/2}$	$2s2p8d$	$(^3P)^4P_{5/2}$	8.35[09]	8.35[09]	6.805	1.08[10]	4.25[08]	164.94	3.50[08]	9.27[-16]
$2s2p^2$	$(^3P)^4P_{3/2}$	$2s2p8d$	$(^3P)^4F_{3/2}$	1.16[09]	1.16[09]	6.774	1.59[09]	2.30[08]	164.95	1.72[08]	4.56[-16]
$2s2p^2$	$(^3P)^4F_{5/2}$	$2s2p8d$	$(^3P)^4F_{7/2}$	8.83[10]	8.83[10]	6.795	5.49[09]	2.97[09]	164.97	2.95[09]	7.81[-15]
$2s2p^2$	$(^3P)^4F_{5/2}$	$2s2p8d$	$(^3P)^4F_{5/2}$	5.83[10]	5.83[10]	6.781	4.12[09]	1.40[08]	165.00	1.38[08]	3.68[-16]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2s2p6d$	$(^1P)^2F_{5/2}$	4.59[13]	5.30[13]	13.401	3.89[10]	1.64[10]	165.11	1.42[10]	1.95[-14]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2s2p6d$	$(^1P)^2F_{7/2}$	4.59[13]	5.29[13]	13.401	5.16[10]	2.32[10]	165.11	2.01[10]	2.76[-14]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2s2p6d$	$(^1P)^2F_{5/2}$	4.59[13]	5.30[13]	13.401	3.89[10]	1.14[09]	165.11	9.89[08]	1.36[-15]
$2s2p^2$	$(^3P)^4P_{1/2}$	$2s2p8s$	$(^3P)^4P_{3/2}$	3.01[11]	3.01[11]	6.503	2.21[09]	3.27[08]	165.51	3.26[08]	8.91[-16]
$2s2p^2$	$(^3P)^4P_{3/2}$	$2s2p8s$	$(^3P)^4P_{1/2}$	1.66[11]	1.66[11]	6.485	1.08[09]	3.12[08]	165.59	3.11[08]	8.51[-16]
$2s2p^2$	$(^3P)^4F_{5/2}$	$2s2p8s$	$(^3P)^4P_{3/2}$	3.01[11]	3.01[11]	6.503	2.21[09]	3.42[08]	165.61	3.41[08]	9.32[-16]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{CH}$
Conf.	$LSJ$	Conf.	$LSJ$	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	$\text{\AA}$	$s^{-1}$	$\text{cm}^3/s$
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p6s$	$(^1P) ^2P_{3/2}$	2.67[13]	3.30[13]	12.658	1.89[10]	2.06[09]	166.76	1.67[09]	2.46[-15]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p6s$	$(^1P) ^2P_{1/2}$	2.69[13]	3.32[13]	12.658	9.48[09]	1.16[09]	166.76	9.35[08]	1.38[-15]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p6s$	$(^1P) ^2P_{3/2}$	2.67[13]	3.30[13]	12.658	1.89[10]	2.31[08]	166.76	1.87[08]	2.76[-16]
$2s2p^2$	$(^3P) ^4P_{3/2}$	$2s2p7d$	$(^3P) ^2D_{5/2}$	3.28[12]	3.28[12]	5.812	3.52[10]	1.57[08]	167.09	1.56[08]	4.58[-16]
$2s2p^2$	$(^3P) ^4P_{3/2}$	$2s2p7d$	$(^3P) ^4P_{5/2}$	1.05[10]	1.05[10]	5.769	1.78[10]	1.65[09]	167.19	1.29[09]	3.78[-15]
$2s2p^2$	$(^3P) ^4P_{5/2}$	$2s2p7d$	$(^3P) ^4P_{5/2}$	1.05[10]	1.05[10]	5.769	1.78[10]	1.32[10]	167.25	1.03[10]	3.02[-14]
$2s2p^2$	$(^3P) ^4P_{5/2}$	$2s2p7d$	$(^3P) ^4D_{7/2}$	5.65[10]	5.65[10]	5.758	2.83[10]	2.32[10]	167.27	2.18[10]	6.42[-14]
$2s2p^2$	$(^3P) ^4P_{3/2}$	$2s2p7d$	$(^3P) ^4P_{5/2}$	1.05[10]	1.05[10]	5.731	1.78[10]	1.34[10]	167.28	1.05[10]	3.09[-14]
$2s2p^2$	$(^3P) ^4P_{3/2}$	$2s2p7d$	$(^3P) ^4F_{5/2}$	2.04[11]	2.04[11]	5.693	5.05[09]	1.77[09]	167.36	1.76[09]	5.22[-15]
$2s2p^2$	$(^3P) ^4P_{5/2}$	$2s2p7d$	$(^3P) ^4F_{7/2}$	2.99[11]	2.99[11]	5.707	7.06[09]	2.90[09]	167.39	2.89[09]	8.55[-15]
$2s2p^2$	$(^3P) ^4P_{5/2}$	$2s2p7d$	$(^3P) ^4F_{5/2}$	2.04[11]	2.04[11]	5.693	5.05[09]	2.29[08]	167.42	2.28[08]	6.75[-16]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p8d$	$(^1P) ^2P_{1/2}$	2.58[13]	3.36[13]	16.201	1.46[10]	1.58[09]	168.06	1.22[09]	1.26[-15]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p8d$	$(^1P) ^2P_{3/2}$	2.58[13]	3.36[13]	16.201	2.91[10]	3.06[09]	168.06	2.35[09]	2.43[-15]
$2s2p^2$	$(^3P) ^4P_{1/2}$	$2s2p7s$	$(^3P) ^4P_{3/2}$	4.50[11]	4.50[11]	5.267	3.38[09]	5.38[08]	168.29	5.37[08]	1.66[-15]
$2s2p^2$	$(^3P) ^4P_{1/2}$	$2s2p7s$	$(^3P) ^4P_{1/2}$	2.47[11]	2.47[11]	5.249	1.66[09]	1.06[08]	168.33	1.06[08]	3.28[-16]
$2s2p^2$	$(^3P) ^4P_{3/2}$	$2s2p7s$	$(^3P) ^4P_{3/2}$	4.50[11]	4.50[11]	5.267	3.38[09]	1.64[08]	168.33	1.64[08]	5.06[-16]
$2s2p^2$	$(^3P) ^4P_{3/2}$	$2s2p7s$	$(^3P) ^4P_{1/2}$	2.47[11]	2.47[11]	5.249	1.66[09]	5.20[08]	168.37	5.18[08]	1.60[-15]
$2s2p^2$	$(^3P) ^4P_{5/2}$	$2s2p7s$	$(^3P) ^4P_{3/2}$	4.50[11]	4.50[11]	5.267	3.38[09]	5.68[08]	168.39	5.66[08]	1.75[-15]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p7d$	$(^1P) ^2P_{1/2}$	3.71[13]	5.09[13]	15.141	1.33[10]	1.97[09]	170.51	1.43[09]	1.65[-15]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p7d$	$(^1P) ^2P_{3/2}$	3.71[13]	5.11[13]	15.141	2.67[10]	3.80[09]	170.51	2.76[09]	3.18[-15]
$2s2p^2$	$(^3P) ^4P_{3/2}$	$2s2p6d$	$(^3P) ^2D_{5/2}$	4.02[09]	4.02[09]	4.098	2.43[10]	3.01[09]	171.04	1.50[09]	5.21[-15]
$2s2p^2$	$(^3P) ^4P_{5/2}$	$2s2p6d$	$(^3P) ^4P_{5/2}$	7.25[09]	7.25[09]	4.108	2.20[10]	1.17[10]	171.08	7.79[09]	2.70[-14]
$2s2p^2$	$(^3P) ^4P_{1/2}$	$2s2p6d$	$(^3P) ^4D_{3/2}$	1.68[08]	1.68[08]	4.063	2.27[10]	1.25[10]	171.09	3.61[08]	1.26[-15]
$2s2p^2$	$(^3P) ^4P_{5/2}$	$2s2p6d$	$(^3P) ^2D_{5/2}$	4.02[09]	4.02[09]	4.098	2.43[10]	1.03[10]	171.10	5.11[09]	1.78[-14]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p5d$	$(^1P) ^2P_{1/2}$	7.23[13]	9.40[13]	10.766	2.22[10]	3.17[08]	171.11	2.44[08]	4.35[-16]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p5d$	$(^1P) ^2P_{3/2}$	7.23[13]	9.42[13]	10.767	4.44[10]	5.64[08]	171.11	4.33[08]	7.71[-16]
$2s2p^2$	$(^3P) ^4P_{3/2}$	$2s2p6d$	$(^3P) ^4D_{3/2}$	1.68[08]	1.68[08]	4.063	2.27[10]	6.40[09]	171.12	1.84[08]	6.42[-16]
$2s2p^2$	$(^3P) ^4P_{5/2}$	$2s2p6d$	$(^3P) ^4D_{7/2}$	2.01[09]	2.01[09]	4.087	4.72[10]	4.01[10]	171.13	1.02[10]	3.54[-14]
$2s2p^2$	$(^3P) ^4P_{3/2}$	$2s2p6d$	$(^3P) ^4D_{5/2}$	1.12[09]	1.12[09]	4.062	2.96[10]	2.35[10]	171.13	4.35[09]	1.52[-14]
$2s2p^2$	$(^3P) ^4P_{3/2}$	$2s2p6d$	$(^3P) ^4F_{5/2}$	2.95[09]	2.95[09]	4.004	6.26[09]	1.22[09]	171.26	9.04[08]	3.17[-15]
$2s2p^2$	$(^3P) ^4P_{5/2}$	$2s2p6d$	$(^3P) ^4F_{7/2}$	4.96[09]	4.96[09]	4.018	8.77[09]	2.40[09]	171.29	1.97[09]	6.89[-15]
$2s2p^2$	$(^3P) ^4P_{5/2}$	$2s2p6d$	$(^3P) ^4F_{5/2}$	2.95[09]	2.95[09]	4.004	6.26[09]	2.65[08]	171.33	1.96[08]	6.86[-16]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p5d$	$(^1P) ^2F_{5/2}$	1.19[14]	1.40[14]	10.619	4.99[10]	2.44[10]	171.46	2.08[10]	3.76[-14]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p5d$	$(^1P) ^2F_{7/2}$	1.19[14]	1.40[14]	10.619	6.61[10]	3.45[10]	171.46	2.94[10]	5.33[-14]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p5d$	$(^1P) ^2F_{5/2}$	1.19[14]	1.40[14]	10.619	4.99[10]	1.75[09]	171.46	1.49[09]	2.69[-15]
$2s2p^2$	$(^3P) ^2P_{1/2}$	$2s2p8d$	$(^1P) ^2P_{1/2}$	2.58[13]	3.36[13]	16.201	1.46[10]	1.71[09]	172.66	1.31[09]	1.36[-15]
$2s2p^2$	$(^3P) ^2P_{1/2}$	$2s2p8d$	$(^1P) ^2P_{3/2}$	2.58[13]	3.36[13]	16.201	2.91[10]	9.00[08]	172.66	6.91[08]	7.16[-16]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2s2p8d$	$(^1P) ^2P_{3/2}$	2.58[13]	3.36[13]	16.201	2.91[10]	4.36[09]	172.74	3.35[09]	3.47[-15]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2s2p8d$	$(^1P) ^2P_{1/2}$	2.58[13]	3.36[13]	16.201	1.46[10]	8.67[08]	172.74	6.67[08]	6.90[-16]
$2s2p^2$	$(^3P) ^4P_{1/2}$	$2s2p6s$	$(^3P) ^4P_{3/2}$	1.01[10]	1.01[10]	3.308	5.34[09]	9.27[08]	172.89	8.18[08]	3.08[-15]
$2s2p^2$	$(^3P) ^4P_{1/2}$	$2s2p6s$	$(^3P) ^4P_{1/2}$	2.85[09]	2.85[09]	3.290	2.64[09]	1.84[08]	172.93	1.25[08]	4.72[-16]
$2s2p^2$	$(^3P) ^4P_{3/2}$	$2s2p6s$	$(^3P) ^4P_{3/2}$	1.01[10]	1.01[10]	3.308	5.34[09]	2.88[08]	172.93	2.54[08]	9.57[-16]
$2s2p^2$	$(^3P) ^4P_{3/2}$	$2s2p6s$	$(^3P) ^4P_{1/2}$	2.85[09]	2.85[09]	3.290	2.64[09]	9.04[08]	172.97	6.18[08]	2.33[-15]
$2s2p^2$	$(^3P) ^4P_{5/2}$	$2s2p6s$	$(^3P) ^4P_{3/2}$	1.01[10]	1.01[10]	3.308	5.34[09]	9.84[08]	172.99	8.69[08]	3.27[-15]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2s2p8s$	$(^1P) ^2P_{3/2}$	1.21[13]	5.49[13]	15.886	1.38[10]	5.36[08]	173.50	1.18[08]	1.26[-16]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p6d$	$(^1P) ^2P_{1/2}$	4.66[13]	6.20[13]	13.498	1.59[10]	2.74[09]	174.45	2.06[09]	2.80[-15]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p6d$	$(^1P) ^2P_{3/2}$	4.66[13]	6.20[13]	13.498	3.18[10]	5.29[09]	174.45	3.97[09]	5.39[-15]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p5s$	$(^1P) ^2P_{3/2}$	3.89[13]	3.89[13]	9.337	2.09[10]	1.93[09]	174.55	1.93[09]	3.98[-15]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p5s$	$(^1P) ^2P_{3/2}$	3.89[13]	3.89[13]	9.337	2.09[10]	2.20[08]	174.55	2.20[08]	4.53[-16]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p5s$	$(^1P) ^2P_{1/2}$	3.93[13]	3.93[13]	9.337	1.05[10]	1.08[09]	174.56	1.08[09]	2.23[-15]
$2s2p^2$	$(^3P) ^2P_{1/2}$	$2s2p7d$	$(^1P) ^2P_{1/2}$	3.71[13]	5.09[13]	15.141	1.33[10]	2.04[09]	175.25	1.49[09]	1.71[-15]
$2s2p^2$	$(^3P) ^2P_{1/2}$	$2s2p7d$	$(^1P) ^2P_{3/2}$	3.71[13]	5.11[13]	15.141	2.67[10]	1.08[09]	175.25	7.86[08]	9.05[-16]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2s2p7d$	$(^1P) ^2P_{3/2}$	3.71[13]	5.11[13]	15.141	2.67[10]	5.21[09]	175.32	3.79[09]	4.36[-15]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_{\text{eff}}^{\text{H}}$
Conf.	<i>LSJ</i>	Conf.	<i>LSJ</i>	$\text{s}^{-1}$	$\text{s}^{-1}$	eV	$\text{s}^{-1}$	$\text{s}^{-1}$	Å	$\text{s}^{-1}$	$\text{cm}^3/\text{s}$
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p7d$	$(^1P)^2P_{1/2}$	3.71[13]	5.09[13]	15.141	1.33[10]	1.04[09]	175.32	7.60[08]	8.75[-16]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p7s$	$(^1P)^2P_{3/2}$	1.81[13]	8.20[13]	14.779	1.29[10]	6.18[08]	176.23	1.36[08]	1.62[-16]
$2s2p^2$	$(^1S)^2S_{1/2}$	$2s2p6s$	$(^1P)^2P_{3/2}$	2.67[13]	3.30[13]	12.658	1.89[10]	1.77[08]	176.54	1.43[08]	2.11[-16]
$2s2p^2$	$(^3P)^4P_{1/2}$	$2s2p5d$	$(^3P)^2D_{3/2}$	1.80[09]	1.80[09]	1.291	4.08[10]	1.12[09]	177.89	1.67[08]	7.69[-16]
$2s2p^2$	$(^3P)^4P_{5/2}$	$2s2p5d$	$(^3P)^4P_{5/2}$	3.86[09]	3.86[09]	1.328	4.41[10]	3.40[10]	177.90	1.17[10]	5.36[-14]
$2s2p^2$	$(^3P)^4P_{3/2}$	$2s2p5d$	$(^3P)^2D_{5/2}$	2.13[10]	2.13[10]	1.299	6.23[10]	5.67[09]	177.91	3.81[09]	1.75[-14]
$2s2p^2$	$(^3P)^4P_{1/2}$	$2s2p5d$	$(^3P)^4D_{1/2}$	9.14[08]	9.14[08]	1.274	2.11[10]	1.69[10]	177.93	1.34[09]	6.18[-15]
$2s2p^2$	$(^3P)^4P_{3/2}$	$2s2p5d$	$(^3P)^2D_{3/2}$	1.80[09]	1.80[09]	1.291	4.08[10]	1.20[09]	177.93	1.79[08]	8.25[-16]
$2s2p^2$	$(^3P)^4P_{1/2}$	$2s2p5d$	$(^3P)^4D_{3/2}$	1.25[09]	1.25[09]	1.274	4.10[10]	2.02[10]	177.94	2.20[09]	1.01[-14]
$2s2p^2$	$(^3P)^4P_{3/2}$	$2s2p5d$	$(^3P)^4D_{5/2}$	8.16[09]	8.16[09]	1.275	5.81[10]	4.25[10]	177.97	1.95[10]	8.96[-14]
$2s2p^2$	$(^3P)^4P_{3/2}$	$2s2p5d$	$(^3P)^4D_{3/2}$	1.25[09]	1.25[09]	1.274	4.10[10]	1.34[10]	177.98	1.46[09]	6.74[-15]
$2s2p^2$	$(^3P)^4P_{5/2}$	$2s2p5d$	$(^3P)^2D_{5/2}$	2.13[10]	2.13[10]	1.299	6.23[10]	3.52[09]	177.98	2.37[09]	1.09[-14]
$2s2p^2$	$(^3P)^4P_{3/2}$	$2s2p5d$	$(^3P)^4D_{1/2}$	9.14[08]	9.14[08]	1.274	2.11[10]	1.80[09]	177.98	1.43[08]	6.59[-16]
$2s2p^2$	$(^3P)^4P_{5/2}$	$2s2p5d$	$(^3P)^4D_{7/2}$	8.99[09]	8.99[09]	1.294	8.35[10]	7.36[10]	177.99	3.41[10]	1.57[-13]
$2s2p^2$	$(^3P)^4P_{5/2}$	$2s2p5d$	$(^3P)^4D_{5/2}$	8.16[09]	8.16[09]	1.275	5.81[10]	1.69[09]	178.04	7.75[08]	3.57[-15]
$2s2p^2$	$(^3P)^4P_{3/2}$	$2s2p5d$	$(^3P)^4F_{5/2}$	9.97[09]	9.97[09]	1.171	8.53[09]	7.49[08]	178.24	6.55[08]	3.05[-15]
$2s2p^2$	$(^3P)^4P_{5/2}$	$2s2p5d$	$(^3P)^4F_{7/2}$	1.60[10]	1.60[10]	1.185	1.15[10]	1.56[09]	178.27	1.43[09]	6.66[-15]
$2s2p^2$	$(^3P)^4P_{5/2}$	$2s2p5d$	$(^3P)^4F_{5/2}$	9.97[09]	9.97[09]	1.171	8.53[09]	2.24[08]	178.31	1.96[08]	9.13[-16]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p6d$	$(^1P)^2P_{1/2}$	4.66[13]	6.20[13]	13.498	1.59[10]	3.00[09]	179.41	2.25[09]	3.06[-15]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p6d$	$(^1P)^2P_{3/2}$	4.66[13]	6.20[13]	13.498	3.18[10]	1.58[09]	179.41	1.19[09]	1.61[-15]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p6d$	$(^1P)^2P_{3/2}$	4.66[13]	6.20[13]	13.498	3.18[10]	7.68[09]	179.49	5.77[09]	7.83[-15]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p6d$	$(^1P)^2P_{1/2}$	4.66[13]	6.20[13]	13.498	1.59[10]	1.52[09]	179.50	1.15[09]	1.55[-15]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2p^23p$	$(^1S)^2P_{1/2}$	5.73[12]	5.73[12]	6.992	7.13[09]	1.10[09]	180.52	1.10[09]	2.87[-15]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2p^23p$	$(^1S)^2P_{3/2}$	6.59[12]	6.59[12]	6.988	1.58[10]	1.76[09]	180.53	1.76[09]	4.58[-15]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2p^23p$	$(^1S)^2F_{3/2}$	6.59[12]	6.59[12]	6.988	1.58[10]	1.14[08]	180.53	1.13[08]	2.95[-16]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2s2p8d$	$(^3P)^2F_{7/2}$	6.17[12]	6.17[12]	6.920	4.74[10]	3.94[10]	180.71	3.94[10]	1.03[-13]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2s2p8g$	$(^3P)^2F_{5/2}$	3.85[10]	3.85[10]	6.909	1.90[09]	1.96[08]	180.73	1.94[08]	5.09[-16]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2s2p8d$	$(^3P)^2P_{1/2}$	4.17[12]	4.17[12]	6.899	1.94[10]	5.12[08]	180.76	5.11[08]	1.34[-15]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2s2p8d$	$(^3P)^2F_{5/2}$	5.46[12]	5.46[12]	6.896	3.26[10]	2.27[10]	180.77	2.27[10]	5.95[-14]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2s2p8d$	$(^3P)^2F_{5/2}$	5.46[12]	5.46[12]	6.896	3.26[10]	3.49[09]	180.77	3.48[09]	9.15[-15]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2s2p8d$	$(^3P)^2P_{3/2}$	3.08[12]	3.08[12]	6.893	3.50[10]	1.34[09]	180.78	1.33[09]	3.50[-15]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2s2p8d$	$(^3P)^2D_{5/2}$	6.77[11]	6.77[11]	6.848	1.51[10]	4.30[09]	180.89	4.28[09]	1.13[-14]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2s2p8d$	$(^3P)^2D_{5/2}$	6.77[11]	6.77[11]	6.848	1.51[10]	7.29[08]	180.89	7.26[08]	1.92[-15]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2s2p8d$	$(^3P)^4D_{5/2}$	8.58[10]	8.58[10]	6.843	1.38[10]	6.24[08]	180.91	6.07[08]	1.60[-15]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2s2p8d$	$(^3P)^4D_{5/2}$	8.58[10]	8.58[10]	6.843	1.38[10]	2.26[08]	180.91	2.20[08]	5.80[-16]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2s2p8d$	$(^3P)^2D_{3/2}$	1.29[11]	1.29[11]	6.836	1.08[10]	1.81[09]	180.93	1.77[09]	4.68[-15]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2s2p8d$	$(^3P)^4F_{5/2}$	8.35[09]	8.35[09]	6.805	1.08[10]	1.67[08]	181.01	1.37[08]	3.63[-16]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2s2p8d$	$(^3P)^4F_{7/2}$	8.83[10]	8.83[10]	6.795	5.49[09]	4.90[08]	181.04	4.86[08]	1.29[-15]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2s2p8d$	$(^3P)^4F_{5/2}$	5.83[10]	5.83[10]	6.781	4.12[09]	2.18[08]	181.07	2.16[08]	5.73[-16]
$2s2p^2$	$(^1S)^2S_{1/2}$	$2s2p5d$	$(^1P)^2P_{3/2}$	7.23[13]	9.42[13]	10.767	4.44[10]	8.39[09]	181.42	6.44[09]	1.15[-14]
$2s2p^2$	$(^1S)^2S_{1/2}$	$2s2p5d$	$(^1P)^2P_{1/2}$	7.23[13]	9.40[13]	10.766	2.22[10]	4.37[09]	181.43	3.36[09]	6.00[-15]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2s2p8s$	$(^3P)^2P_{3/2}$	2.44[13]	2.44[13]	6.592	5.56[09]	2.20[09]	181.57	2.19[09]	5.94[-15]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2s2p8s$	$(^3P)^2P_{3/2}$	2.44[13]	2.44[13]	6.592	5.56[09]	2.40[08]	181.57	2.40[08]	6.50[-16]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p6s$	$(^1P)^2P_{1/2}$	2.69[13]	3.32[13]	12.658	9.48[09]	6.28[08]	181.62	5.08[08]	7.49[-16]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p6s$	$(^1P)^2P_{3/2}$	2.67[13]	3.30[13]	12.658	1.89[10]	3.03[08]	181.62	2.46[08]	3.62[-16]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2s2p8s$	$(^3P)^2P_{1/2}$	2.34[13]	2.34[13]	6.553	2.82[09]	1.24[09]	181.68	1.24[09]	3.36[-15]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p6s$	$(^1P)^2P_{3/2}$	2.67[13]	3.30[13]	12.658	1.89[10]	1.53[09]	181.70	1.24[09]	1.83[-15]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p6s$	$(^1P)^2P_{1/2}$	2.69[13]	3.32[13]	12.658	9.48[09]	3.19[08]	181.70	2.58[08]	3.81[-16]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2s2p7d$	$(^3P)^2P_{1/2}$	5.68[10]	5.68[10]	5.891	9.46[09]	7.78[08]	183.46	7.18[08]	2.08[-15]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2s2p7d$	$(^3P)^2F_{7/2}$	2.61[13]	2.61[13]	5.885	5.93[10]	5.20[10]	183.47	5.20[10]	1.51[-13]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2s2p7d$	$(^3P)^2P_{3/2}$	4.83[10]	4.83[10]	5.877	1.90[10]	1.53[09]	183.49	1.39[09]	4.05[-15]
$2s2p^2$	$(^1D)^2D_{3/2}$	$2s2p7g$	$(^3P)^2F_{5/2}$	1.28[12]	1.28[12]	5.867	4.35[09]	1.50[09]	183.52	1.50[09]	4.36[-15]
$2s2p^2$	$(^1D)^2D_{5/2}$	$2s2p7g$	$(^3P)^2F_{5/2}$	1.28[12]	1.28[12]	5.867	4.35[09]	1.60[08]	183.52	1.60[08]	4.66[-16]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_{S}^{\text{eff}}$
Conf.	$LSJ$	Conf.	$LSJ$	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	$\text{\AA}$	$s^{-1}$	$\text{cm}^3/s$
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p7g$	$(^3P) ^4F_{5/2}$	5.73[12]	5.73[12]	5.862	1.16[10]	7.15[09]	183.53	7.15[09]	2.08[-14]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p7g$	$(^3P) ^4F_{5/2}$	5.73[12]	5.73[12]	5.862	1.16[10]	8.04[08]	183.53	8.03[08]	2.34[-15]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p7d$	$(^3P) ^2F_{5/2}$	1.83[13]	1.83[13]	5.861	3.30[10]	2.36[10]	183.54	2.36[10]	6.88[-14]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p7d$	$(^3P) ^2F_{5/2}$	1.83[13]	1.83[13]	5.861	3.30[10]	2.75[09]	183.54	2.75[09]	8.01[-15]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2p^24p$	$(^3P) ^2P_{3/2}$	2.54[12]	2.02[14]	11.952	2.82[10]	1.14[10]	183.60	1.43[08]	2.27[-16]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p7d$	$(^3P) ^2D_{5/2}$	3.28[12]	3.28[12]	5.812	3.52[10]	5.13[09]	183.67	5.12[09]	1.50[-14]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p7d$	$(^3P) ^2D_{5/2}$	3.28[12]	3.28[12]	5.812	3.52[10]	2.34[08]	183.67	2.33[08]	6.82[-16]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p7d$	$(^3P) ^2D_{3/2}$	5.20[09]	5.20[09]	5.802	2.29[10]	8.20[08]	183.70	3.90[08]	1.14[-15]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p7d$	$(^3P) ^4F_{7/2}$	2.99[11]	2.99[11]	5.707	7.06[09]	3.59[08]	183.96	3.58[08]	1.06[-15]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p7d$	$(^3P) ^4F_{5/2}$	2.04[11]	2.04[11]	5.693	5.05[09]	1.60[08]	183.99	1.60[08]	4.73[-16]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p4d$	$(^1P) ^2P_{1/2}$	8.34[13]	8.34[13]	5.691	3.45[10]	1.96[08]	184.00	1.96[08]	5.79[-16]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p4d$	$(^1P) ^2P_{3/2}$	8.20[13]	8.20[13]	5.692	6.86[10]	3.16[08]	184.00	3.16[08]	9.35[-16]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p4d$	$(^1P) ^2D_{5/2}$	9.78[11]	9.78[11]	5.434	1.05[11]	1.47[09]	184.70	1.45[09]	4.39[-15]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p4d$	$(^1P) ^2D_{5/2}$	9.78[11]	9.78[11]	5.434	1.05[11]	9.06[09]	184.70	8.90[09]	2.71[-14]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p4d$	$(^1P) ^2D_{3/2}$	1.86[09]	1.86[09]	5.432	6.95[10]	6.46[09]	184.71	6.24[08]	1.90[-15]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p4d$	$(^1P) ^2F_{5/2}$	3.01[14]	3.01[14]	5.409	6.22[10]	3.40[10]	184.77	3.40[10]	1.04[-13]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p4d$	$(^1P) ^2F_{7/2}$	3.04[14]	3.04[14]	5.411	8.42[10]	5.06[10]	184.77	5.06[10]	1.54[-13]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p4d$	$(^1P) ^2F_{5/2}$	3.01[14]	3.01[14]	5.409	6.22[10]	3.02[09]	184.77	3.02[09]	9.21[-15]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p7s$	$(^3P) ^2P_{3/2}$	3.64[13]	3.64[13]	5.389	1.09[10]	3.06[09]	184.83	3.06[09]	9.34[-15]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p7s$	$(^3P) ^2P_{3/2}$	3.64[13]	3.64[13]	5.389	1.09[10]	3.18[08]	184.83	3.18[08]	9.71[-16]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p7s$	$(^3P) ^2P_{1/2}$	3.50[13]	3.50[13]	5.352	5.29[09]	1.70[09]	184.93	1.70[09]	5.20[-15]
$2s2p^2$	$(^3P) ^2P_{1/2}$	$2p^24p$	$(^3P) ^2S_{1/2}$	5.04[10]	2.18[11]	10.803	1.88[10]	3.58[09]	186.69	7.93[08]	1.41[-15]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2p^24p$	$(^3P) ^2S_{1/2}$	5.04[10]	2.18[11]	10.803	1.88[10]	7.54[09]	186.78	1.67[09]	2.97[-15]
$2s2p^2$	$(^3P) ^2P_{1/2}$	$2s2p5d$	$(^1P) ^2P_{1/2}$	7.23[13]	9.40[13]	10.766	2.22[10]	6.13[09]	186.80	4.71[09]	8.41[-15]
$2s2p^2$	$(^3P) ^2P_{1/2}$	$2s2p5d$	$(^1P) ^2P_{3/2}$	7.23[13]	9.42[13]	10.767	4.44[10]	3.06[09]	186.80	2.35[09]	4.19[-15]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2s2p5d$	$(^1P) ^2P_{3/2}$	7.23[13]	9.42[13]	10.767	4.44[10]	1.49[10]	186.88	1.14[10]	2.04[-14]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2s2p5d$	$(^1P) ^2P_{1/2}$	7.23[13]	9.40[13]	10.766	2.22[10]	2.70[09]	186.89	2.08[09]	3.70[-15]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p6d$	$(^3P) ^2P_{1/2}$	4.07[10]	4.07[10]	4.295	1.10[10]	7.51[08]	187.89	6.62[08]	2.25[-15]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p6d$	$(^3P) ^2P_{3/2}$	3.63[10]	3.63[10]	4.278	2.19[10]	1.57[09]	187.94	1.36[09]	4.64[-15]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p6g$	$(^3P) ^4F_{7/2}$	7.78[09]	7.78[09]	4.254	5.62[09]	3.54[08]	188.01	3.25[08]	1.11[-15]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p6d$	$(^3P) ^2F_{7/2}$	5.36[11]	5.36[11]	4.249	4.38[10]	3.65[10]	188.02	3.61[10]	1.24[-13]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p6g$	$(^3P) ^2F_{7/2}$	1.72[09]	1.72[09]	4.247	5.55[09]	2.80[08]	188.03	1.99[08]	6.81[-16]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p6d$	$(^3P) ^2F_{5/2}$	5.45[11]	5.45[11]	4.222	3.30[10]	2.45[10]	188.10	2.42[10]	8.31[-14]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p6d$	$(^3P) ^2F_{5/2}$	5.45[11]	5.45[11]	4.222	3.30[10]	3.03[09]	188.10	3.00[09]	1.03[-14]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p6d$	$(^3P) ^4P_{5/2}$	7.25[09]	7.25[09]	4.108	2.20[10]	3.06[09]	188.43	2.03[09]	7.05[-15]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p6d$	$(^3P) ^4P_{5/2}$	7.25[09]	7.25[09]	4.108	2.20[10]	1.06[09]	188.43	7.01[08]	2.43[-15]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p6d$	$(^3P) ^2D_{5/2}$	4.02[09]	4.02[09]	4.098	2.43[10]	3.65[09]	188.45	1.82[09]	6.32[-15]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p6d$	$(^3P) ^2D_{5/2}$	4.02[09]	4.02[09]	4.098	2.43[10]	9.29[08]	188.45	4.63[08]	1.61[-15]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p6d$	$(^3P) ^2D_{3/2}$	5.26[08]	5.26[08]	4.092	1.17[10]	5.26[09]	188.47	8.02[08]	2.79[-15]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p6d$	$(^3P) ^4D_{5/2}$	1.12[09]	1.12[09]	4.062	2.96[10]	5.42[08]	188.56	1.00[08]	3.50[-16]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p6s$	$(^3P) ^2P_{3/2}$	2.19[13]	2.19[13]	3.570	1.33[10]	4.39[09]	189.98	4.38[09]	1.61[-14]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p6s$	$(^3P) ^2P_{3/2}$	2.19[13]	2.19[13]	3.570	1.33[10]	4.89[08]	189.98	4.89[08]	1.79[-15]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p6s$	$(^3P) ^2P_{1/2}$	2.02[13]	2.02[13]	3.536	6.77[09]	2.44[09]	190.08	2.44[09]	8.97[-15]
$2s2p^2$	$(^3P) ^2P_{1/2}$	$2s2p5s$	$(^1P) ^2P_{1/2}$	3.93[13]	3.93[13]	9.337	1.05[10]	9.42[08]	190.91	9.42[08]	1.94[-15]
$2s2p^2$	$(^3P) ^2P_{1/2}$	$2s2p5s$	$(^1P) ^2P_{3/2}$	3.89[13]	3.89[13]	9.337	2.09[10]	4.72[08]	190.91	4.72[08]	9.70[-16]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2s2p5s$	$(^1P) ^2P_{3/2}$	3.89[13]	3.89[13]	9.337	2.09[10]	2.36[09]	191.00	2.35[09]	4.84[-15]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2s2p5s$	$(^1P) ^2P_{1/2}$	3.93[13]	3.93[13]	9.337	1.05[10]	4.70[08]	191.00	4.70[08]	9.66[-16]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2p^23p$	$(^1S) ^2P_{3/2}$	6.59[12]	6.59[12]	6.988	1.58[10]	5.87[08]	192.04	5.87[08]	1.53[-15]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p8d$	$(^3P) ^2P_{1/2}$	4.17[12]	4.17[12]	6.899	1.94[10]	1.14[10]	192.31	1.13[10]	2.97[-14]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p8d$	$(^3P) ^2P_{3/2}$	3.08[12]	3.08[12]	6.893	3.50[10]	2.07[10]	192.33	2.07[10]	5.43[-14]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p8d$	$(^3P) ^2D_{3/2}$	1.29[11]	1.29[11]	6.836	1.08[10]	1.99[09]	192.50	1.95[09]	5.15[-15]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p8d$	$(^3P) ^4D_{1/2}$	1.53[10]	1.53[10]	6.810	5.43[09]	1.69[08]	192.57	1.44[08]	3.81[-16]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p8d$	$(^3P) ^4D_{3/2}$	5.78[09]	5.78[09]	6.808	9.38[09]	1.45[08]	192.58	1.03[08]	2.73[-16]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{\text{eff}}$
Conf.	LSJ	Conf.	LSJ	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	Å	$s^{-1}$	$\text{cm}^3/s$
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p8s$	$(^3P) ^2P_{3/2}$	2.44[13]	2.44[13]	6.592	5.56[09]	4.61[08]	193.23	4.61[08]	1.25[-15]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p8s$	$(^3P) ^2P_{1/2}$	2.34[13]	2.34[13]	6.553	2.82[09]	2.59[08]	193.34	2.59[08]	7.04[-16]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2p^23p$	$(^1D) ^2P_{3/2}$	3.04[13]	3.04[13]	1.803	3.31[10]	1.74[10]	195.27	1.74[10]	7.62[-14]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2p^23p$	$(^1D) ^2P_{3/2}$	3.04[13]	3.04[13]	1.803	3.31[10]	2.51[09]	195.27	2.51[09]	1.10[-14]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2p^23p$	$(^1D) ^2P_{1/2}$	2.98[13]	2.98[13]	1.790	1.67[10]	1.01[10]	195.31	1.01[10]	4.42[-14]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p7d$	$(^3P) ^2P_{1/2}$	5.68[10]	5.68[10]	5.891	9.46[09]	5.76[09]	195.36	5.32[09]	1.54[-14]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p7d$	$(^3P) ^2P_{3/2}$	4.83[10]	4.83[10]	5.877	1.90[10]	1.09[10]	195.41	9.89[09]	2.88[-14]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p7d$	$(^3P) ^2D_{3/2}$	5.20[09]	5.20[09]	5.802	2.29[10]	8.25[08]	195.63	3.93[08]	1.15[-15]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p5d$	$(^3P) ^2P_{1/2}$	1.15[10]	1.15[10]	1.632	1.69[10]	4.59[08]	195.79	2.65[08]	1.18[-15]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p5d$	$(^3P) ^2P_{3/2}$	9.17[09]	9.17[09]	1.615	3.33[10]	7.79[08]	195.85	4.08[08]	1.82[-15]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p5d$	$(^3P) ^2F_{7/2}$	8.87[12]	8.87[12]	1.594	6.69[10]	5.76[10]	195.91	5.75[10]	2.57[-13]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p5g$	$(^3P) ^4F_{7/2}$	7.53[11]	7.53[11]	1.592	1.42[10]	5.30[09]	195.92	5.28[09]	2.36[-14]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p5g$	$(^3P) ^2F_{7/2}$	9.29[09]	9.29[09]	1.580	9.09[09]	1.44[08]	195.95	1.28[08]	5.73[-16]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p4d$	$(^1P) ^2P_{1/2}$	8.34[13]	8.34[13]	5.691	3.45[10]	1.11[10]	195.98	1.11[10]	3.28[-14]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p4d$	$(^1P) ^2P_{3/2}$	8.20[13]	8.20[13]	5.692	6.86[10]	2.14[10]	195.98	2.14[10]	6.33[-14]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p5d$	$(^3P) ^2F_{5/2}$	6.71[12]	6.71[12]	1.570	4.32[10]	3.48[10]	195.99	3.48[10]	1.56[-13]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2p^23p$	$(^1D) ^2D_{3/2}$	6.73[10]	6.73[10]	1.558	1.70[10]	6.22[09]	196.02	5.85[09]	2.62[-14]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2p^23p$	$(^1D) ^2D_{3/2}$	6.73[10]	6.73[10]	1.558	1.70[10]	1.48[09]	196.02	1.40[09]	6.25[-15]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2p^23p$	$(^1D) ^2D_{5/2}$	2.80[12]	2.80[12]	1.553	3.41[10]	1.41[10]	196.04	1.41[10]	6.32[-14]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2p^23p$	$(^1D) ^2D_{5/2}$	2.80[12]	2.80[12]	1.553	3.41[10]	8.41[09]	196.04	8.39[09]	3.76[-14]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p5d$	$(^3P) ^4P_{5/2}$	3.86[09]	3.86[09]	1.328	4.41[10]	1.63[09]	196.74	5.61[08]	2.57[-15]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p5d$	$(^3P) ^2D_{5/2}$	2.13[10]	2.13[10]	1.299	6.23[10]	2.65[10]	196.83	1.78[10]	8.20[-14]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p5d$	$(^3P) ^2D_{5/2}$	2.13[10]	2.13[10]	1.299	6.23[10]	2.81[09]	196.83	1.89[09]	8.70[-15]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p5d$	$(^3P) ^2D_{3/2}$	1.80[09]	1.80[09]	1.291	4.08[10]	1.92[10]	196.86	2.87[09]	1.32[-14]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p5d$	$(^3P) ^2D_{3/2}$	1.80[09]	1.80[09]	1.291	4.08[10]	2.11[09]	196.86	3.17[08]	1.46[-15]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p5d$	$(^3P) ^4D_{5/2}$	8.16[09]	8.16[09]	1.275	5.81[10]	3.70[09]	196.91	1.69[09]	7.80[-15]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p5d$	$(^3P) ^4D_{3/2}$	1.25[09]	1.25[09]	1.274	4.10[10]	1.29[09]	196.91	1.40[08]	6.45[-16]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p5d$	$(^3P) ^4D_{5/2}$	8.16[09]	8.16[09]	1.275	5.81[10]	4.66[08]	196.91	2.13[08]	9.81[-16]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p7s$	$(^3P) ^2P_{3/2}$	3.64[13]	3.64[13]	5.389	1.09[10]	2.12[09]	196.92	2.12[09]	6.47[-15]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p7s$	$(^3P) ^2P_{1/2}$	3.50[13]	3.50[13]	5.352	5.29[09]	1.04[09]	197.04	1.04[09]	3.18[-15]
$2s2p^2$	$(^3P) ^2P_{1/2}$	$2p^23p$	$(^1S) ^2P_{1/2}$	5.73[12]	5.73[12]	6.992	7.13[09]	1.07[08]	198.06	1.07[08]	2.78[-16]
$2s2p^2$	$(^3P) ^2P_{1/2}$	$2p^23p$	$(^1S) ^2P_{3/2}$	6.59[12]	6.59[12]	6.988	1.58[10]	1.87[08]	198.07	1.87[08]	4.86[-16]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2p^23p$	$(^1S) ^2P_{3/2}$	6.59[12]	6.59[12]	6.988	1.58[10]	4.41[08]	198.17	4.41[08]	1.15[-15]
$2s2p^2$	$(^3P) ^2P_{1/2}$	$2s2p8d$	$(^3P) ^2P_{1/2}$	4.17[12]	4.17[12]	6.899	1.94[10]	2.15[09]	198.35	2.15[09]	5.63[-15]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2s2p8d$	$(^3P) ^2P_{1/2}$	4.17[12]	4.17[12]	6.899	1.94[10]	1.01[09]	198.45	1.00[09]	2.64[-15]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2s2p8d$	$(^3P) ^2F_{5/2}$	5.46[12]	5.46[12]	6.896	3.26[10]	7.80[08]	198.46	7.79[08]	2.05[-15]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2s2p8d$	$(^3P) ^2P_{3/2}$	3.08[12]	3.08[12]	6.893	3.50[10]	5.48[09]	198.47	5.47[09]	1.44[-14]
$2s2p^2$	$(^3P) ^2P_{1/2}$	$2s2p8d$	$(^3P) ^2D_{3/2}$	1.29[11]	1.29[11]	6.836	1.08[10]	4.24[09]	198.56	4.15[09]	1.10[-14]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2s2p8d$	$(^3P) ^2D_{5/2}$	6.77[11]	6.77[11]	6.848	1.51[10]	4.39[09]	198.62	4.37[09]	1.15[-14]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2s2p8d$	$(^3P) ^4D_{5/2}$	8.58[10]	8.58[10]	6.843	1.38[10]	1.07[09]	198.63	1.04[09]	2.74[-15]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2s2p8d$	$(^3P) ^4P_{5/2}$	8.35[09]	8.35[09]	6.805	1.08[10]	5.50[08]	198.75	4.53[08]	1.20[-15]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2s2p8s$	$(^3P) ^2P_{3/2}$	2.44[13]	2.44[13]	6.592	5.56[09]	2.14[08]	199.44	2.14[08]	5.80[-16]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2p^23p$	$(^1D) ^2F_{7/2}$	3.38[13]	3.38[13]	0.413	4.30[10]	3.61[10]	199.64	3.61[10]	1.81[-13]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2p^23p$	$(^1D) ^2F_{5/2}$	3.38[13]	3.38[13]	0.405	3.24[10]	2.55[10]	199.66	2.55[10]	1.28[-13]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2p^23p$	$(^1D) ^2F_{5/2}$	3.38[13]	3.38[13]	0.405	3.24[10]	1.64[09]	199.66	1.64[09]	8.25[-15]
$2s2p^2$	$(^1D) ^2D_{5/2}$	$2s2p5s$	$(^3P) ^2P_{3/2}$	5.58[13]	5.58[13]	0.218	9.29[09]	2.39[08]	200.27	2.39[08]	1.22[-15]
$2s2p^2$	$(^1D) ^2D_{3/2}$	$2s2p5s$	$(^3P) ^2P_{1/2}$	5.56[13]	5.56[13]	0.185	4.71[09]	1.23[08]	200.37	1.23[08]	6.32[-16]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p6d$	$(^3P) ^2P_{1/2}$	4.07[10]	4.07[10]	4.295	1.10[10]	7.15[09]	200.40	6.30[09]	2.15[-14]
$2s2p^2$	$(^1S) ^2S_{1/2}$	$2s2p6d$	$(^3P) ^2P_{3/2}$	3.63[10]	3.63[10]	4.278	2.19[10]	1.43[10]	200.45	1.24[10]	4.24[-14]
$2s2p^2$	$(^3P) ^2P_{1/2}$	$2s2p7d$	$(^3P) ^2P_{1/2}$	5.68[10]	5.68[10]	5.891	9.46[09]	9.30[08]	201.60	8.59[08]	2.49[-15]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2s2p7d$	$(^3P) ^2P_{1/2}$	5.68[10]	5.68[10]	5.891	9.46[09]	4.39[08]	201.71	4.05[08]	1.18[-15]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2s2p7d$	$(^3P) ^2P_{3/2}$	4.83[10]	4.83[10]	5.877	1.90[10]	3.31[09]	201.75	3.02[09]	8.78[-15]
$2s2p^2$	$(^3P) ^2P_{3/2}$	$2s2p7g$	$(^3P) ^4F_{5/2}$	5.73[12]	5.73[12]	5.862	1.16[10]	4.62[08]	201.80	4.62[08]	1.34[-15]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_{\text{eff}}^{\text{H}}$
Conf.	<i>LSJ</i>	Conf.	<i>LSJ</i>	$\text{s}^{-1}$	$\text{s}^{-1}$	eV	$\text{s}^{-1}$	$\text{s}^{-1}$	$\text{\AA}$	$\text{s}^{-1}$	$\text{cm}^3/\text{s}$
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p7d$	$(^3P)^2F_{5/2}$	1.83[13]	1.83[13]	5.861	3.30[10]	1.82[09]	201.81	1.82[09]	5.29[-15]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p7d$	$(^3P)^2D_{3/2}$	5.20[09]	5.20[09]	5.802	2.29[10]	1.52[10]	201.90	7.24[09]	2.12[-14]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p7d$	$(^3P)^2D_{5/2}$	3.28[12]	3.28[12]	5.812	3.52[10]	2.32[10]	201.97	2.31[10]	6.76[-14]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p7d$	$(^3P)^2D_{3/2}$	5.20[09]	5.20[09]	5.802	2.29[10]	1.67[09]	202.00	7.94[08]	2.33[-15]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p7d$	$(^3P)^4P_{3/2}$	1.05[10]	1.05[10]	5.769	1.78[10]	1.47[08]	202.11	1.15[08]	3.37[-16]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p7d$	$(^3P)^4P_{5/2}$	1.05[10]	1.05[10]	5.731	1.78[10]	6.30[08]	202.24	4.90[08]	1.45[-15]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p4d$	$(^1P)^2P_{1/2}$	8.34[13]	8.34[13]	5.691	3.45[10]	8.76[09]	202.26	8.76[09]	2.60[-14]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p4d$	$(^1P)^2P_{3/2}$	8.20[13]	8.20[13]	5.692	6.86[10]	4.63[09]	202.26	4.63[09]	1.37[-14]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p4d$	$(^1P)^2P_{3/2}$	8.20[13]	8.20[13]	5.692	6.86[10]	2.24[10]	202.36	2.24[10]	6.63[-14]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p4d$	$(^1P)^2P_{1/2}$	8.34[13]	8.34[13]	5.691	3.45[10]	4.50[09]	202.37	4.50[09]	1.33[-14]
$2s2p^2$	$(^1S)^2S_{1/2}$	$2s2p6s$	$(^3P)^2P_{3/2}$	2.19[13]	2.19[13]	3.570	1.33[10]	2.85[08]	202.78	2.85[08]	1.04[-15]
$2s2p^2$	$(^1S)^2S_{1/2}$	$2s2p6s$	$(^3P)^2P_{1/2}$	2.02[13]	2.02[13]	3.536	6.77[09]	1.52[08]	202.89	1.52[08]	5.57[-16]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p4d$	$(^1P)^2D_{3/2}$	1.86[09]	1.86[09]	5.432	6.95[10]	3.87[10]	203.12	3.74[09]	1.14[-14]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p4d$	$(^1P)^2D_{5/2}$	9.78[11]	9.78[11]	5.434	1.05[11]	7.05[10]	203.22	6.92[10]	2.10[-13]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p4d$	$(^1P)^2D_{3/2}$	1.86[09]	1.86[09]	5.432	6.95[10]	7.81[09]	203.23	7.54[08]	2.29[-15]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p7s$	$(^3P)^2P_{3/2}$	3.64[13]	3.64[13]	5.389	1.09[10]	3.29[08]	203.26	3.29[08]	1.00[-15]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p4d$	$(^1P)^2F_{5/2}$	3.01[14]	3.01[14]	5.409	6.22[10]	1.59[08]	203.30	1.59[08]	4.84[-16]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p7s$	$(^3P)^2P_{3/2}$	3.64[13]	3.64[13]	5.389	1.09[10]	1.76[09]	203.37	1.76[09]	5.36[-15]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p7s$	$(^3P)^2P_{1/2}$	3.50[13]	3.50[13]	5.352	5.29[09]	6.05[08]	203.39	6.05[08]	1.85[-15]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p7s$	$(^3P)^2P_{1/2}$	3.50[13]	3.50[13]	5.352	5.29[09]	3.09[08]	203.49	3.09[08]	9.46[-16]
$2s2p^2$	$(^1S)^2S_{1/2}$	$2s2p4s$	$(^1P)^2P_{3/2}$	3.90[13]	3.90[13]	3.089	1.96[10]	2.54[09]	204.39	2.54[09]	9.77[-15]
$2s2p^2$	$(^1S)^2S_{1/2}$	$2s2p4s$	$(^1P)^2P_{1/2}$	4.13[13]	4.13[13]	3.078	9.66[09]	1.23[09]	204.42	1.23[09]	4.72[-15]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p6d$	$(^3P)^2P_{1/2}$	4.07[10]	4.07[10]	4.295	1.10[10]	8.85[08]	206.98	7.79[08]	2.65[-15]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p6d$	$(^3P)^2P_{3/2}$	3.63[10]	3.63[10]	4.278	2.19[10]	2.47[08]	207.03	2.15[08]	7.33[-16]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p6d$	$(^3P)^2P_{1/2}$	4.07[10]	4.07[10]	4.295	1.10[10]	4.14[08]	207.08	3.65[08]	1.24[-15]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p6d$	$(^3P)^2P_{3/2}$	3.63[10]	3.63[10]	4.278	2.19[10]	2.12[09]	207.14	1.84[09]	6.29[-15]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p6d$	$(^3P)^2D_{3/2}$	5.26[08]	5.26[08]	4.092	1.17[10]	1.27[09]	207.68	1.93[08]	6.70[-16]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p6s$	$(^3P)^4P_{5/2}$	7.25[09]	7.25[09]	4.108	2.20[10]	8.86[08]	207.73	5.89[08]	2.04[-15]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p6d$	$(^3P)^2D_{5/2}$	4.02[09]	4.02[09]	4.098	2.43[10]	1.03[09]	207.77	5.15[08]	1.79[-15]
$2s2p^2$	$(^1S)^2S_{1/2}$	$2p^23p$	$(^1D)^2P_{3/2}$	3.04[13]	3.04[13]	1.803	3.31[10]	6.70[08]	208.81	6.70[08]	2.93[-15]
$2s2p^2$	$(^1S)^2S_{1/2}$	$2p^23p$	$(^1D)^2P_{1/2}$	2.98[13]	2.98[13]	1.790	1.67[10]	3.51[08]	208.86	3.51[08]	1.53[-15]
$2s2p^2$	$(^1S)^2S_{1/2}$	$2s2p5d$	$(^3P)^2P_{1/2}$	1.15[10]	1.15[10]	1.632	1.69[10]	1.14[10]	209.42	6.55[09]	2.91[-14]
$2s2p^2$	$(^1S)^2S_{1/2}$	$2s2p5d$	$(^3P)^2P_{3/2}$	9.17[09]	9.17[09]	1.615	3.33[10]	2.26[10]	209.48	1.19[10]	5.28[-14]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p6s$	$(^3P)^2P_{3/2}$	2.19[13]	2.19[13]	3.570	1.33[10]	6.93[08]	209.51	6.93[08]	2.54[-15]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p6s$	$(^3P)^2P_{3/2}$	2.19[13]	2.19[13]	3.570	1.33[10]	3.48[09]	209.62	3.48[09]	1.27[-14]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p6s$	$(^3P)^2P_{1/2}$	2.02[13]	2.02[13]	3.536	6.77[09]	1.43[09]	209.63	1.43[09]	5.24[-15]
$2s2p^2$	$(^1S)^2S_{1/2}$	$2p^23p$	$(^1D)^2D_{3/2}$	6.73[10]	6.73[10]	1.558	1.70[10]	3.52[08]	209.68	3.31[08]	1.48[-15]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p6s$	$(^3P)^2P_{1/2}$	2.02[13]	2.02[13]	3.536	6.77[09]	7.09[08]	209.74	7.08[08]	2.60[-15]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p4s$	$(^1P)^2P_{3/2}$	3.90[13]	3.90[13]	3.089	1.96[10]	9.48[08]	211.23	9.48[08]	3.64[-15]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p4s$	$(^1P)^2P_{1/2}$	4.13[13]	4.13[13]	3.078	9.66[09]	1.98[09]	211.27	1.98[09]	7.60[-15]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p4s$	$(^1P)^2P_{3/2}$	3.90[13]	3.90[13]	3.089	1.96[10]	5.12[09]	211.34	5.12[09]	1.97[-14]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p4s$	$(^1P)^2P_{1/2}$	4.13[13]	4.13[13]	3.078	9.66[09]	9.56[08]	211.38	9.56[08]	3.68[-15]
$2s2p^2$	$(^1S)^2S_{1/2}$	$2s2p5s$	$(^3P)^2P_{3/2}$	5.58[13]	5.58[13]	0.218	9.29[09]	1.69[09]	214.54	1.69[09]	8.67[-15]
$2s2p^2$	$(^1S)^2S_{1/2}$	$2s2p5s$	$(^3P)^2P_{1/2}$	5.56[13]	5.56[13]	0.185	4.71[09]	8.85[08]	214.66	8.85[08]	4.55[-15]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p5d$	$(^3P)^2P_{1/2}$	1.15[10]	1.15[10]	1.632	1.69[10]	2.02[09]	216.61	1.17[09]	5.19[-15]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p5d$	$(^3P)^2P_{3/2}$	9.17[09]	9.17[09]	1.615	3.33[10]	8.69[08]	216.67	4.56[08]	2.03[-15]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p5d$	$(^3P)^2P_{1/2}$	1.15[10]	1.15[10]	1.632	1.69[10]	9.52[08]	216.73	5.49[08]	2.44[-15]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p5d$	$(^3P)^2P_{3/2}$	9.17[09]	9.17[09]	1.615	3.33[10]	4.63[09]	216.79	2.42[09]	1.08[-14]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2p^23p$	$(^1D)^2D_{3/2}$	6.73[10]	6.73[10]	1.558	1.70[10]	2.27[09]	216.89	2.13[09]	9.55[-15]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p5d$	$(^3P)^2F_{5/2}$	6.71[12]	6.71[12]	1.570	4.32[10]	8.96[08]	216.96	8.95[08]	4.00[-15]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2p^23p$	$(^1D)^2D_{3/2}$	6.73[10]	6.73[10]	1.558	1.70[10]	1.06[09]	217.01	1.00[09]	4.48[-15]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2p^23p$	$(^1D)^2D_{5/2}$	2.80[12]	2.80[12]	1.553	3.41[10]	3.54[09]	217.02	3.53[09]	1.58[-14]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p5d$	$(^3P)^4P_{5/2}$	3.86[09]	3.86[09]	1.328	4.41[10]	1.08[09]	217.88	3.70[08]	1.70[-15]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{\text{eff}}$
Conf.	<i>LSJ</i>	Conf.	<i>LSJ</i>	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	Å	$s^{-1}$	$\text{cm}^3/s$
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p5d$	$(^3P)^2D_{3/2}$	1.80[09]	1.80[09]	1.291	4.08[10]	1.11[10]	217.91	1.67[09]	7.66[-15]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p5d$	$(^3P)^2D_{5/2}$	2.13[10]	2.13[10]	1.299	6.23[10]	1.76[10]	218.00	1.18[10]	5.44[-14]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p5d$	$(^3P)^2D_{3/2}$	1.80[09]	1.80[09]	1.291	4.08[10]	1.85[09]	218.03	2.77[08]	1.27[-15]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p5d$	$(^3P)^4D_{5/2}$	8.16[09]	8.16[09]	1.275	5.81[10]	2.49[09]	218.09	1.14[09]	5.24[-15]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p5s$	$(^3P)^2P_{3/2}$	5.58[13]	5.58[13]	0.218	9.29[09]	5.62[08]	222.09	5.62[08]	2.88[-15]
$2s2p^2$	$(^3P)^2P_{1/2}$	$2s2p5s$	$(^3P)^2P_{1/2}$	5.56[13]	5.56[13]	0.185	4.71[09]	1.08[09]	222.22	1.08[09]	5.55[-15]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p5s$	$(^3P)^2P_{3/2}$	5.58[13]	5.58[13]	0.218	9.29[09]	2.64[09]	222.22	2.64[09]	1.35[-14]
$2s2p^2$	$(^3P)^2P_{3/2}$	$2s2p5s$	$(^3P)^2P_{1/2}$	5.56[13]	5.56[13]	0.185	4.71[09]	5.69[08]	222.35	5.69[08]	2.92[-15]
$2s^23s$	$(^1S)^2S_{1/2}$	$2s2p8d$	$(^1P)^2P_{1/2}$	2.58[13]	3.36[13]	16.201	1.46[10]	1.43[08]	250.89	1.10[08]	1.14[-16]
$2s^23s$	$(^1S)^2S_{1/2}$	$2s2p8d$	$(^1P)^2P_{3/2}$	2.58[13]	3.36[13]	16.201	2.91[10]	2.87[08]	250.89	2.20[08]	2.28[-16]
$2s^23d$	$(^1S)^2D_{3/2}$	$2s2p8g$	$(^1P)^2F_{5/2}$	3.54[11]	3.78[11]	16.236	2.02[10]	1.98[08]	297.34	1.84[08]	1.89[-16]
$2s^23d$	$(^1S)^2D_{5/2}$	$2s2p8g$	$(^1P)^2F_{7/2}$	3.55[11]	3.78[11]	16.236	2.69[10]	2.83[08]	297.36	2.62[08]	2.71[-16]
$2s^23d$	$(^1S)^2D_{3/2}$	$2s2p8d$	$(^1P)^2P_{1/2}$	2.58[13]	3.36[13]	16.201	1.46[10]	1.63[09]	297.60	1.26[09]	1.30[-15]
$2s^23d$	$(^1S)^2D_{3/2}$	$2s2p8d$	$(^1P)^2P_{3/2}$	2.58[13]	3.36[13]	16.201	2.91[10]	3.28[08]	297.60	2.52[08]	2.61[-16]
$2s^23d$	$(^1S)^2D_{5/2}$	$2s2p8d$	$(^1P)^2P_{3/2}$	2.58[13]	3.36[13]	16.201	2.91[10]	2.94[09]	297.61	2.26[09]	2.34[-15]
$2s^23d$	$(^1S)^2D_{3/2}$	$2s2p7d$	$(^1P)^2P_{1/2}$	3.71[13]	5.09[13]	15.141	1.33[10]	5.54[08]	305.36	4.04[08]	4.65[-16]
$2s^23d$	$(^1S)^2D_{5/2}$	$2s2p7d$	$(^1P)^2P_{3/2}$	3.71[13]	5.11[13]	15.141	2.67[10]	9.97[08]	305.37	7.25[08]	8.35[-16]
$2s^23s$	$(^1S)^2S_{1/2}$	$2s2p8d$	$(^3P)^2P_{3/2}$	3.08[12]	3.08[12]	6.893	3.50[10]	1.05[08]	309.11	1.05[08]	2.76[-16]
$2s^23d$	$(^1S)^2D_{3/2}$	$2s2p6d$	$(^1P)^2P_{1/2}$	4.66[13]	6.20[13]	13.498	1.59[10]	3.05[08]	318.24	2.29[08]	3.11[-16]
$2s^23d$	$(^1S)^2D_{5/2}$	$2s2p6d$	$(^1P)^2P_{3/2}$	4.66[13]	6.20[13]	13.498	3.18[10]	5.50[08]	318.26	4.13[08]	5.61[-16]
$2s^23d$	$(^1S)^2D_{3/2}$	$2s2p5d$	$(^1P)^2P_{1/2}$	7.23[13]	9.40[13]	10.766	2.22[10]	1.95[08]	342.24	1.50[08]	2.68[-16]
$2s^23d$	$(^1S)^2D_{5/2}$	$2s2p5d$	$(^1P)^2P_{3/2}$	7.23[13]	9.42[13]	10.767	4.44[10]	3.52[08]	342.25	2.70[08]	4.82[-16]
$2s^23s$	$(^1S)^2S_{1/2}$	$2p^23p$	$(^1D)^2P_{3/2}$	3.04[13]	3.04[13]	1.803	3.31[10]	1.04[08]	354.03	1.04[08]	4.56[-16]
$2s2p3p$	$(^3P)^2D_{5/2}$	$2s2p8d$	$(^1P)^2F_{7/2}$	1.58[13]	2.03[13]	16.168	3.23[10]	1.76[08]	367.86	1.37[08]	1.42[-16]
$2s^23d$	$(^1S)^2D_{5/2}$	$2p^23p$	$(^1S)^2P_{3/2}$	6.59[12]	6.59[12]	6.988	1.58[10]	1.07[08]	382.11	1.07[08]	2.79[-16]
$2s^23d$	$(^1S)^2D_{3/2}$	$2s2p4d$	$(^1P)^2P_{1/2}$	8.34[13]	8.34[13]	5.691	3.45[10]	1.17[08]	398.00	1.16[08]	3.45[-16]
$2s^23d$	$(^1S)^2D_{5/2}$	$2s2p4d$	$(^1P)^2P_{3/2}$	8.20[13]	8.20[13]	5.692	6.86[10]	2.08[08]	398.01	2.08[08]	6.17[-16]
$2s^23d$	$(^1S)^2D_{3/2}$	$2s2p4d$	$(^1P)^2F_{5/2}$	3.01[14]	3.01[14]	5.409	6.22[10]	1.71[08]	401.63	1.71[08]	5.20[-16]
$2s^23d$	$(^1S)^2D_{5/2}$	$2s2p4d$	$(^1P)^2F_{7/2}$	3.04[14]	3.04[14]	5.411	8.42[10]	2.48[08]	401.63	2.48[08]	7.55[-16]
$2s^24d$	$(^1S)^2D_{3/2}$	$2s2p8d$	$(^1P)^2P_{1/2}$	2.58[13]	3.36[13]	16.201	1.46[10]	3.34[08]	411.27	2.57[08]	2.66[-16]
$2s^24d$	$(^1S)^2D_{5/2}$	$2s2p8d$	$(^1P)^2P_{3/2}$	2.58[13]	3.36[13]	16.201	2.91[10]	6.01[08]	411.28	4.61[08]	4.78[-16]
$2s^24d$	$(^1S)^2D_{5/2}$	$2s2p7d$	$(^1P)^2P_{3/2}$	3.71[13]	5.11[13]	15.141	2.67[10]	2.36[08]	426.25	1.71[08]	1.97[-16]
$2s^24d$	$(^1S)^2D_{5/2}$	$2s2p6d$	$(^1P)^2P_{3/2}$	4.66[13]	6.20[13]	13.498	3.18[10]	1.46[08]	451.78	1.10[08]	1.49[-16]
$2p^23s$	$(^1D)^2D_{5/2}$	$2p^27p$	$(^1D)^2F_{7/2}$	2.16[11]	2.40[12]	24.592	1.14[10]	1.13[09]	456.01	1.02[08]	4.55[-17]
$2s^23d$	$(^1S)^2D_{5/2}$	$2s2p5d$	$(^3P)^2F_{7/2}$	8.87[12]	8.87[12]	1.594	6.69[10]	1.79[08]	458.30	1.79[08]	7.97[-16]
$2s^23d$	$(^1S)^2D_{3/2}$	$2s2p5d$	$(^3P)^2F_{5/2}$	6.71[12]	6.71[12]	1.570	4.32[10]	1.13[08]	458.68	1.13[08]	5.04[-16]
$2s2p3p$	$(^3P)^2P_{3/2}$	$2s2p8d$	$(^3P)^2P_{3/2}$	3.08[12]	3.08[12]	6.893	3.50[10]	2.88[08]	468.74	2.87[08]	7.53[-16]
$2s2p3p$	$(^3P)^4D_{5/2}$	$2s2p8d$	$(^3P)^4D_{5/2}$	8.58[10]	8.58[10]	6.843	1.38[10]	1.38[08]	469.32	1.35[08]	3.56[-16]
$2s2p3p$	$(^3P)^2P_{3/2}$	$2s2p8d$	$(^3P)^2D_{5/2}$	6.77[11]	6.77[11]	6.848	1.51[10]	3.78[08]	469.54	3.76[08]	9.93[-16]
$2s2p3p$	$(^3P)^2P_{1/2}$	$2s2p8d$	$(^3P)^2D_{3/2}$	1.29[11]	1.29[11]	6.836	1.08[10]	3.45[08]	469.55	3.38[08]	8.92[-16]
$2s2p3p$	$(^3P)^4D_{7/2}$	$2s2p8d$	$(^3P)^4D_{7/2}$	1.25[10]	1.25[10]	6.837	1.79[10]	3.10[08]	469.88	2.63[08]	6.94[-16]
$2s2p3p$	$(^3P)^4D_{1/2}$	$2s2p8d$	$(^3P)^4F_{3/2}$	1.16[09]	1.16[09]	6.774	1.59[09]	1.97[08]	469.93	1.46[08]	3.89[-16]
$2s2p3p$	$(^3P)^4D_{3/2}$	$2s2p8d$	$(^3P)^4F_{5/2}$	5.83[10]	5.83[10]	6.781	4.12[09]	2.87[08]	470.06	2.83[08]	7.53[-16]
$2s2p3p$	$(^3P)^4D_{5/2}$	$2s2p8d$	$(^3P)^4F_{7/2}$	8.83[10]	8.83[10]	6.795	5.49[09]	4.52[08]	470.18	4.49[08]	1.19[-15]
$2s^23d$	$(^1S)^2D_{5/2}$	$2p^23p$	$(^1D)^2F_{7/2}$	3.38[13]	3.38[13]	0.413	4.30[10]	9.79[08]	479.21	9.79[08]	4.92[-15]
$2s^23d$	$(^1S)^2D_{3/2}$	$2p^23p$	$(^1D)^2F_{5/2}$	3.38[13]	3.38[13]	0.405	3.24[10]	6.84[08]	479.32	6.84[08]	3.44[-15]
$2s2p3p$	$(^1P)^2D_{3/2}$	$2s2p8d$	$(^1P)^2F_{5/2}$	1.58[13]	2.04[13]	16.168	2.43[10]	9.20[08]	479.44	7.13[08]	7.41[-16]
$2s2p3p$	$(^1P)^2D_{5/2}$	$2s2p8d$	$(^1P)^2F_{7/2}$	1.58[13]	2.03[13]	16.168	3.23[10]	1.31[09]	479.50	1.02[09]	1.06[-15]
$2s2p3p$	$(^3P)^4S_{3/2}$	$2s2p8d$	$(^3P)^4P_{3/2}$	3.62[09]	3.62[09]	6.848	7.91[09]	1.92[08]	479.90	1.24[08]	3.28[-16]
$2s2p3p$	$(^3P)^4S_{3/2}$	$2s2p8d$	$(^3P)^4P_{5/2}$	8.35[09]	8.35[09]	6.805	1.08[10]	2.21[08]	480.71	1.82[08]	4.82[-16]
$2s2p3p$	$(^1P)^2P_{1/2}$	$2s2p8d$	$(^1P)^2P_{1/2}$	2.58[13]	3.36[13]	16.201	1.46[10]	1.33[08]	482.52	1.02[08]	1.06[-16]
$2s2p3p$	$(^1P)^2P_{3/2}$	$2s2p8d$	$(^1P)^2P_{3/2}$	2.58[13]	3.36[13]	16.201	2.91[10]	3.27[08]	482.67	2.51[08]	2.60[-16]
$2s2p3p$	$(^3P)^2P_{1/2}$	$2s2p7d$	$(^3P)^2P_{1/2}$	5.68[10]	5.68[10]	5.891	9.46[09]	1.64[08]	486.97	1.51[08]	4.40[-16]



Low level		Upper level		A <sub>a</sub>	ΣA <sub>a</sub>	E <sub>S</sub>	ΣgA <sub>r</sub>	gA <sub>r</sub>	λ	Q <sub>d</sub>	C <sub>S</sub> <sup>eff</sup>
Conf.	LSJ	Conf.	LSJ	s <sup>-1</sup>	s <sup>-1</sup>	eV	s <sup>-1</sup>	s <sup>-1</sup>	Å	s <sup>-1</sup>	cm <sup>3</sup> /s
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	4.83[10]	4.83[10]	5.877	1.90[10]	5.46[08]	487.46	4.97[08]	1.45[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	1.83[13]	1.83[13]	5.861	3.30[10]	1.05[08]	487.77	1.05[08]	3.05[-16]
2p <sup>2</sup> 3s	( <sup>1</sup> D) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 6p	( <sup>1</sup> D) <sup>2</sup> F <sub>5/2</sub>	5.13[11]	5.28[12]	22.798	1.10[10]	1.23[09]	488.15	1.19[08]	6.37[-17]
2p <sup>2</sup> 3s	( <sup>1</sup> D) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 6p	( <sup>1</sup> D) <sup>2</sup> F <sub>7/2</sub>	5.12[11]	5.28[12]	22.799	1.46[10]	1.73[09]	488.20	1.68[08]	9.01[-17]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	5.20[09]	5.20[09]	5.802	2.29[10]	7.69[08]	488.67	3.66[08]	1.07[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.28[12]	3.28[12]	5.812	3.52[10]	1.14[09]	488.71	1.13[09]	3.32[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	1.05[10]	1.05[10]	5.769	1.78[10]	1.98[08]	489.22	1.54[08]	4.53[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	5.65[10]	5.65[10]	5.758	2.83[10]	7.84[08]	489.92	7.38[08]	2.17[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	1.05[10]	1.05[10]	5.731	1.78[10]	2.81[08]	489.95	2.19[08]	6.45[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>1/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	3.42[08]	3.42[08]	5.686	2.57[09]	6.99[08]	490.15	2.43[08]	7.21[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2.04[11]	2.04[11]	5.693	5.05[09]	1.15[09]	490.27	1.15[09]	3.40[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2.99[11]	2.99[11]	5.707	7.06[09]	1.79[09]	490.40	1.79[09]	5.28[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2.04[11]	2.04[11]	5.693	5.05[09]	1.64[08]	490.67	1.64[08]	4.85[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p8d	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2.58[13]	3.36[13]	16.201	1.46[10]	3.26[08]	496.14	2.51[08]	2.60[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p8d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2.58[13]	3.36[13]	16.201	2.91[10]	6.60[08]	496.14	5.07[08]	5.25[-16]
2s <sup>2</sup> 5d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	2s2p8d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2.58[13]	3.36[13]	16.201	2.91[10]	1.81[08]	496.22	1.39[08]	1.44[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.64[13]	3.64[13]	5.389	1.09[10]	1.61[08]	496.99	1.60[08]	4.90[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p7s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	4.50[11]	4.50[11]	5.267	3.38[09]	1.51[08]	499.09	1.50[08]	4.65[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	3.62[09]	3.62[09]	6.848	7.91[09]	4.19[08]	499.69	2.71[08]	7.15[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	8.58[10]	8.58[10]	6.843	1.38[10]	2.88[08]	499.79	2.81[08]	7.41[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	3.62[09]	3.62[09]	6.848	7.91[09]	3.31[08]	500.05	2.14[08]	5.64[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	6.77[11]	6.77[11]	6.848	1.51[10]	2.42[08]	500.06	2.41[08]	6.37[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	8.58[10]	8.58[10]	6.843	1.38[10]	8.51[08]	500.15	8.29[08]	2.19[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>4</sup> D <sub>1/2</sub>	1.53[10]	1.53[10]	6.810	5.43[09]	5.05[08]	500.23	4.29[08]	1.14[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p7d	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	2.90[13]	3.68[13]	15.093	2.63[10]	1.73[09]	500.25	1.36[09]	1.58[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	5.78[09]	5.78[09]	6.808	9.38[09]	6.57[08]	500.26	4.67[08]	1.24[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	1.25[10]	1.25[10]	6.837	1.79[10]	1.82[09]	500.27	1.54[09]	4.07[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p7d	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	2.89[13]	3.66[13]	15.093	3.50[10]	2.47[09]	500.30	1.95[09]	2.25[-15]
2s <sup>2</sup> 5g	( <sup>1</sup> S) <sup>2</sup> G <sub>7/2</sub>	2s2p8g	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	3.54[11]	3.78[11]	16.236	2.02[10]	2.10[08]	500.33	1.95[08]	2.01[-16]
2s <sup>2</sup> 5g	( <sup>1</sup> S) <sup>2</sup> G <sub>9/2</sub>	2s2p8g	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	3.55[11]	3.78[11]	16.236	2.69[10]	2.72[08]	500.33	2.53[08]	2.61[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	5.78[09]	5.78[09]	6.808	9.38[09]	2.22[08]	500.49	1.58[08]	4.19[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	8.35[09]	8.35[09]	6.805	1.08[10]	8.62[08]	500.57	7.09[08]	1.88[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> S <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	1.05[10]	1.05[10]	5.769	1.78[10]	5.04[08]	500.83	3.92[08]	1.15[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	5.83[10]	5.83[10]	6.781	4.12[09]	2.79[08]	501.06	2.76[08]	7.33[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	8.83[10]	8.83[10]	6.795	5.49[09]	3.86[08]	501.13	3.83[08]	1.02[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> S <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	1.05[10]	1.05[10]	5.731	1.78[10]	5.21[08]	501.60	4.05[08]	1.20[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p7d	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	3.71[13]	5.09[13]	15.141	1.33[10]	1.77[08]	503.27	1.29[08]	1.49[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.71[13]	5.11[13]	15.141	2.67[10]	4.35[08]	503.44	3.16[08]	3.64[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2s2p8s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	3.01[11]	3.01[11]	6.503	2.21[09]	1.23[08]	506.51	1.22[08]	3.35[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	5.46[12]	5.46[12]	6.896	3.26[10]	2.50[09]	506.79	2.50[09]	6.57[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	6.17[12]	6.17[12]	6.920	4.74[10]	4.51[09]	506.97	4.51[09]	1.18[-14]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p8s	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	1.66[11]	1.66[11]	6.485	1.08[09]	1.18[08]	507.11	1.17[08]	3.21[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p8s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	3.01[11]	3.01[11]	6.503	2.21[09]	1.30[08]	507.11	1.30[08]	3.55[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	5.46[12]	5.46[12]	6.896	3.26[10]	5.97[08]	507.47	5.96[08]	1.57[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	6.77[11]	6.77[11]	6.848	1.51[10]	6.12[08]	507.78	6.10[08]	1.61[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	1.29[11]	1.29[11]	6.836	1.08[10]	4.91[08]	508.04	4.81[08]	1.27[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	6.77[11]	6.77[11]	6.848	1.51[10]	3.96[08]	508.47	3.95[08]	1.04[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p8s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2.44[13]	2.44[13]	6.592	5.56[09]	5.30[08]	513.87	5.30[08]	1.43[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p8s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2.34[13]	2.34[13]	6.553	2.82[09]	2.93[08]	513.98	2.93[08]	7.96[-16]
2s <sup>2</sup> 4s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> S) <sup>2</sup> P <sub>1/2</sub>	5.73[12]	5.73[12]	6.992	7.13[09]	1.62[08]	515.07	1.62[08]	4.20[-16]
2s <sup>2</sup> 4s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	6.59[12]	6.59[12]	6.988	1.58[10]	2.86[08]	515.15	2.86[08]	7.44[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p7d	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	3.71[13]	5.09[13]	15.141	1.33[10]	3.80[08]	518.10	2.77[08]	3.19[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p7d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.71[13]	5.11[13]	15.141	2.67[10]	7.71[08]	518.10	5.60[08]	6.45[-16]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{\text{eff}}$
Conf.	LSJ	Conf.	LSJ	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	Å	$s^{-1}$	$\text{cm}^3/s$
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.07[10]	4.07[10]	4.295	1.10[10]	2.40[08]	519.53	2.11[08]	7.19[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.07[10]	4.07[10]	4.295	1.10[10]	1.31[08]	519.78	1.15[08]	3.93[-16]
2s <sup>2</sup> 5s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	2s2p6d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	4.66[13]	6.20[13]	13.498	3.18[10]	1.45[08]	520.10	1.09[08]	1.48[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.63[10]	3.63[10]	4.278	2.19[10]	7.24[08]	520.15	6.29[08]	2.15[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	1.05[10]	1.05[10]	5.769	1.78[10]	1.75[08]	522.42	1.37[08]	4.01[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	1.05[10]	1.05[10]	5.769	1.78[10]	1.19[09]	522.81	9.27[08]	2.73[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	5.65[10]	5.65[10]	5.758	2.83[10]	2.17[09]	523.05	2.04[09]	6.01[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	1.05[10]	1.05[10]	5.731	1.78[10]	1.20[09]	523.26	9.33[08]	2.75[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	4.02[09]	4.02[09]	4.098	2.43[10]	2.20[08]	523.73	1.09[08]	3.80[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	7.25[09]	7.25[09]	4.108	2.20[10]	9.84[08]	523.89	6.53[08]	2.27[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	5.26[08]	5.26[08]	4.092	1.17[10]	1.26[09]	524.01	1.92[08]	6.67[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2.04[11]	2.04[11]	5.693	5.05[09]	1.57[08]	524.08	1.57[08]	4.64[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	4.02[09]	4.02[09]	4.098	2.43[10]	1.14[09]	524.11	5.65[08]	1.96[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2.99[11]	2.99[11]	5.707	7.06[09]	2.63[08]	524.17	2.63[08]	7.77[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2.01[09]	2.01[09]	4.087	4.72[10]	1.25[09]	524.56	3.17[08]	1.10[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2.95[09]	2.95[09]	4.004	6.26[09]	2.31[09]	525.36	1.71[09]	5.98[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	4.96[09]	4.96[09]	4.018	8.77[09]	3.60[09]	525.51	2.95[09]	1.03[-14]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2.95[09]	2.95[09]	4.004	6.26[09]	4.72[08]	525.83	3.49[08]	1.22[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	4.96[09]	4.96[09]	4.018	8.77[09]	2.56[08]	526.08	2.10[08]	7.35[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	5.73[12]	5.73[12]	5.862	1.16[10]	4.25[08]	529.15	4.25[08]	1.24[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	1.83[13]	1.83[13]	5.861	3.30[10]	1.45[09]	529.18	1.45[09]	4.21[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2.61[13]	2.61[13]	5.885	5.93[10]	3.45[09]	529.37	3.45[09]	1.00[-14]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	1.83[13]	1.83[13]	5.861	3.30[10]	3.34[08]	529.92	3.33[08]	9.71[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.28[12]	3.28[12]	5.812	3.52[10]	4.81[08]	530.27	4.80[08]	1.41[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	5.20[09]	5.20[09]	5.802	2.29[10]	4.38[08]	530.50	2.08[08]	6.10[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> S) <sup>2</sup> P <sub>1/2</sub>	5.73[12]	5.73[12]	6.992	7.13[09]	4.58[08]	530.69	4.58[08]	1.19[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	6.59[12]	6.59[12]	6.988	1.58[10]	7.26[08]	530.77	7.25[08]	1.89[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.28[12]	3.28[12]	5.812	3.52[10]	4.44[08]	531.02	4.43[08]	1.30[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.17[12]	4.17[12]	6.899	1.94[10]	4.03[08]	532.80	4.02[08]	1.06[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.08[12]	3.08[12]	6.893	3.50[10]	8.65[08]	532.94	8.62[08]	2.27[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2s2p7s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	4.50[11]	4.50[11]	5.267	3.38[09]	1.54[08]	533.43	1.54[08]	4.76[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p7s	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2.47[11]	2.47[11]	5.249	1.66[09]	1.48[08]	534.10	1.47[08]	4.56[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p7s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	4.50[11]	4.50[11]	5.267	3.38[09]	1.63[08]	534.10	1.63[08]	5.03[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	1.29[11]	1.29[11]	6.836	1.08[10]	1.30[08]	534.26	1.27[08]	3.36[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2.19[13]	2.19[13]	3.570	1.33[10]	2.01[08]	536.09	2.01[08]	7.35[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> S <sub>3/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	7.25[09]	7.25[09]	4.108	2.20[10]	8.81[08]	536.83	5.85[08]	2.03[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p6d	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	4.59[13]	5.30[13]	13.401	3.89[10]	2.88[09]	536.89	2.49[09]	3.41[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p6d	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	4.59[13]	5.29[13]	13.401	5.16[10]	4.10[09]	536.96	3.56[09]	4.87[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p6d	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	4.59[13]	5.30[13]	13.401	3.89[10]	2.03[08]	536.96	1.76[08]	2.41[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> S <sub>3/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	4.02[09]	4.02[09]	4.098	2.43[10]	2.59[08]	537.06	1.29[08]	4.48[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> S <sub>3/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.12[09]	1.12[09]	4.062	2.96[10]	6.71[08]	537.92	1.24[08]	4.33[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p6d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	4.66[13]	6.20[13]	13.498	3.18[10]	1.35[08]	539.24	1.02[08]	1.38[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p6d	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.66[13]	6.20[13]	13.498	1.59[10]	2.89[08]	539.25	2.17[08]	2.94[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	4.66[13]	6.20[13]	13.498	3.18[10]	7.11[08]	539.43	5.34[08]	7.25[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6d	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.66[13]	6.20[13]	13.498	1.59[10]	1.41[08]	539.44	1.06[08]	1.43[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	3.01[14]	3.01[14]	5.409	6.22[10]	3.15[08]	539.57	3.15[08]	9.59[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p8s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2.44[13]	2.44[13]	6.592	5.56[09]	2.49[08]	539.93	2.49[08]	6.75[-16]
2p <sup>2</sup> 3s	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2p <sup>2</sup> 5p	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	3.12[08]	1.50[09]	16.922	3.30[10]	2.77[09]	539.95	1.54[08]	1.48[-16]
2s <sup>2</sup> 4s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	4.83[10]	4.83[10]	5.877	1.90[10]	1.92[08]	540.08	1.75[08]	5.08[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	3.04[14]	3.04[14]	5.411	8.42[10]	4.02[08]	540.32	4.02[08]	1.22[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p7s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.64[13]	3.64[13]	5.389	1.09[10]	4.76[08]	540.82	4.76[08]	1.45[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p8s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2.34[13]	2.34[13]	6.553	2.82[09]	1.29[08]	540.84	1.29[08]	3.49[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p7s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	3.50[13]	3.50[13]	5.352	5.29[09]	2.66[08]	540.93	2.66[08]	8.14[-16]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_{SI}^{eff}$
Conf.	$LSJ$	Conf.	$LSJ$	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	$\text{\AA}$	$s^{-1}$	$cm^3/s$
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p6s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	1.01[10]	1.01[10]	3.308	5.34[09]	1.58[08]	541.31	1.40[08]	5.25[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p6s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	1.01[10]	1.01[10]	3.308	5.34[09]	3.35[08]	541.81	2.96[08]	1.11[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p4s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.90[13]	3.90[13]	3.089	1.96[10]	1.01[08]	547.48	1.01[08]	3.90[-16]
2p <sup>2</sup> 3s	( <sup>1</sup> D) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 5p	( <sup>1</sup> D) <sup>2</sup> F <sub>5/2</sub>	1.58[12]	1.54[13]	19.756	1.49[10]	2.07[09]	554.59	2.13[08]	1.55[-16]
2p <sup>2</sup> 3s	( <sup>1</sup> D) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 5p	( <sup>1</sup> D) <sup>2</sup> F <sub>7/2</sub>	1.59[12]	1.54[13]	19.758	1.99[10]	2.90[09]	554.63	2.98[08]	2.16[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p6s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2.69[13]	3.32[13]	12.658	9.48[09]	2.94[08]	554.74	2.38[08]	3.51[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p6s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2.67[13]	3.30[13]	12.658	1.89[10]	5.39[08]	554.80	4.36[08]	6.44[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> S <sub>3/2</sub>	2s2p6s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	1.01[10]	1.01[10]	3.308	5.34[09]	1.81[08]	556.09	1.60[08]	6.01[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p6d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	4.66[13]	6.20[13]	13.498	3.18[10]	1.07[09]	556.30	8.06[08]	1.09[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p6d	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.66[13]	6.20[13]	13.498	1.59[10]	5.29[08]	556.31	3.97[08]	5.39[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	5.68[10]	5.68[10]	5.891	9.46[09]	5.65[08]	556.92	5.22[08]	1.52[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	4.83[10]	4.83[10]	5.877	1.90[10]	1.06[09]	557.28	9.62[08]	2.80[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p6s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2.69[13]	3.32[13]	12.658	9.48[09]	1.95[08]	559.68	1.58[08]	2.33[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2.67[13]	3.30[13]	12.658	1.89[10]	4.91[08]	559.88	3.98[08]	5.87[-16]
2s <sup>2</sup> 6g	( <sup>1</sup> S) <sup>2</sup> G <sub>7/2</sub>	2s2p8g	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	3.54[11]	3.78[11]	16.236	2.02[10]	1.26[08]	560.72	1.17[08]	1.21[-16]
2s <sup>2</sup> 6g	( <sup>1</sup> S) <sup>2</sup> G <sub>9/2</sub>	2s2p8g	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	3.55[11]	3.78[11]	16.236	2.69[10]	1.63[08]	560.72	1.51[08]	1.56[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	8.20[13]	8.20[13]	5.692	6.86[10]	1.31[08]	561.95	1.31[08]	3.89[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	4.02[09]	4.02[09]	4.098	2.43[10]	2.69[08]	561.97	1.34[08]	4.65[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	7.25[09]	7.25[09]	4.108	2.20[10]	9.12[08]	562.17	6.05[08]	2.10[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	4.02[09]	4.02[09]	4.098	2.43[10]	8.62[08]	562.42	4.29[08]	1.49[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2.01[09]	2.01[09]	4.087	4.72[10]	3.35[09]	562.73	8.51[08]	2.96[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	1.12[09]	1.12[09]	4.062	2.96[10]	1.89[09]	562.91	3.49[08]	1.22[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	4.96[09]	4.96[09]	4.018	8.77[09]	1.90[08]	564.47	1.56[08]	5.45[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	5.45[11]	5.45[11]	4.222	3.30[10]	3.36[09]	568.98	3.33[09]	1.14[-14]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	5.36[11]	5.36[11]	4.249	4.38[10]	5.00[09]	569.11	4.95[09]	1.69[-14]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p7s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.64[13]	3.64[13]	5.389	1.09[10]	2.40[08]	569.76	2.40[08]	7.34[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	5.45[11]	5.45[11]	4.222	3.30[10]	4.11[08]	569.84	4.07[08]	1.40[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p7s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	3.50[13]	3.50[13]	5.352	5.29[09]	1.24[08]	570.75	1.24[08]	3.80[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	5.26[08]	5.26[08]	4.092	1.17[10]	7.05[08]	572.39	1.07[08]	3.73[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	7.25[09]	7.25[09]	4.108	2.20[10]	4.38[08]	572.82	2.91[08]	1.01[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	4.02[09]	4.02[09]	4.098	2.43[10]	4.78[08]	573.08	2.38[08]	8.27[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p6s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2.69[13]	3.32[13]	12.658	9.48[09]	3.80[08]	578.08	3.07[08]	4.53[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p6s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2.67[13]	3.30[13]	12.658	1.89[10]	7.46[08]	578.08	6.04[08]	8.92[-16]
2s <sup>2</sup> 4s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.63[10]	3.63[10]	4.278	2.19[10]	1.64[08]	580.50	1.42[08]	4.86[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2s2p6s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	1.01[10]	1.01[10]	3.308	5.34[09]	2.41[08]	582.53	2.13[08]	7.99[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p6s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	1.01[10]	1.01[10]	3.308	5.34[09]	2.54[08]	583.33	2.25[08]	8.44[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p6s	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2.85[09]	2.85[09]	3.290	2.64[09]	2.31[08]	583.34	1.58[08]	5.94[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	1.15[10]	1.15[10]	1.632	1.69[10]	3.24[08]	584.80	1.87[08]	8.31[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	1.15[10]	1.15[10]	1.632	1.69[10]	1.76[08]	585.12	1.02[08]	4.52[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	9.17[09]	9.17[09]	1.615	3.33[10]	1.01[09]	585.59	5.30[08]	2.36[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>1/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> D <sub>3/2</sub>	6.73[10]	6.73[10]	1.558	1.70[10]	1.09[08]	585.72	1.02[08]	4.58[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> D <sub>3/2</sub>	6.73[10]	6.73[10]	1.558	1.70[10]	7.01[08]	586.84	6.59[08]	2.95[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	6.71[12]	6.71[12]	1.570	4.32[10]	4.82[08]	586.84	4.82[08]	2.15[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> D <sub>5/2</sub>	2.80[12]	2.80[12]	1.553	3.41[10]	8.22[08]	587.29	8.20[08]	3.67[-15]
2s <sup>2</sup> 5s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	2s2p5d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	7.23[13]	9.42[13]	10.767	4.44[10]	3.26[08]	587.40	2.50[08]	4.45[-16]
2s <sup>2</sup> 5s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	2s2p5d	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	7.23[13]	9.40[13]	10.766	2.22[10]	1.64[08]	587.42	1.26[08]	2.24[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p6s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2.19[13]	2.19[13]	3.570	1.33[10]	3.28[08]	587.44	3.28[08]	1.20[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p6s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2.02[13]	2.02[13]	3.536	6.77[09]	1.74[08]	587.45	1.74[08]	6.38[-16]
2s <sup>2</sup> 6g	( <sup>1</sup> S) <sup>2</sup> G <sub>9/2</sub>	2s2p7g	( <sup>1</sup> P) <sup>2</sup> H <sub>11/2</sub>	2.02[13]	3.87[13]	15.109	3.64[10]	2.26[08]	590.84	1.18[08]	1.36[-16]
2s <sup>2</sup> 4d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> S) <sup>2</sup> P <sub>1/2</sub>	5.73[12]	5.73[12]	6.992	7.13[09]	1.14[08]	592.16	1.13[08]	2.95[-16]
2s <sup>2</sup> 4d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	6.59[12]	6.59[12]	6.988	1.58[10]	2.30[08]	592.28	2.30[08]	5.99[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2.13[10]	2.13[10]	1.299	6.23[10]	2.07[08]	593.38	1.39[08]	6.39[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2.13[10]	2.13[10]	1.299	6.23[10]	1.87[08]	593.98	1.26[08]	5.77[-16]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{\text{eff}}$
Conf.	$LSJ$	Conf.	$LSJ$	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	$\text{\AA}$	$s^{-1}$	$\text{cm}^3/s$
2s <sup>2</sup> 4d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	6.17[12]	6.17[12]	6.920	4.74[10]	1.98[08]	594.21	1.98[08]	5.18[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	1.80[09]	1.80[09]	1.291	4.08[10]	1.39[09]	594.36	2.08[08]	9.57[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2.13[10]	2.13[10]	1.299	6.23[10]	2.20[09]	594.47	1.48[09]	6.79[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	8.16[09]	8.16[09]	1.275	5.81[10]	7.70[08]	594.67	3.52[08]	1.62[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	8.99[09]	8.99[09]	1.294	8.35[10]	1.78[09]	594.84	8.23[08]	3.78[-15]
2s <sup>2</sup> 4d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	5.46[12]	5.46[12]	6.896	3.26[10]	1.04[08]	594.88	1.03[08]	2.72[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	8.16[09]	8.16[09]	1.275	5.81[10]	4.70[08]	595.16	2.15[08]	9.90[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	9.97[09]	9.97[09]	1.171	8.53[09]	4.22[09]	597.04	3.69[09]	1.72[-14]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.60[10]	1.60[10]	1.185	1.15[10]	6.73[09]	597.23	6.18[09]	2.87[-14]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	9.97[09]	9.97[09]	1.171	8.53[09]	1.11[09]	597.65	9.72[08]	4.53[-15]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.60[10]	1.60[10]	1.185	1.15[10]	7.34[08]	597.96	6.74[08]	3.13[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	9.97[09]	9.97[09]	1.171	8.53[09]	2.55[08]	598.14	2.23[08]	1.04[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.07[10]	4.07[10]	4.295	1.10[10]	7.27[08]	599.92	6.41[08]	2.18[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.63[10]	3.63[10]	4.278	2.19[10]	1.44[09]	600.41	1.25[09]	4.28[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p4s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.13[13]	4.13[13]	3.078	9.66[09]	1.40[08]	600.48	1.40[08]	5.37[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p4s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.90[13]	3.90[13]	3.089	1.96[10]	2.46[08]	601.14	2.46[08]	9.46[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> S <sub>3/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	3.86[09]	3.86[09]	1.328	4.41[10]	2.43[09]	610.29	8.35[08]	3.83[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p5d	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	1.19[14]	1.40[14]	10.619	4.99[10]	5.44[09]	610.42	4.63[09]	8.38[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p5d	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	1.19[14]	1.40[14]	10.619	6.61[10]	7.78[09]	610.51	6.63[09]	1.20[-14]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p5d	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	1.19[14]	1.40[14]	10.619	4.99[10]	3.92[08]	610.51	3.34[08]	6.05[-16]
2s2p3p	( <sup>3</sup> P) <sup>4</sup> S <sub>3/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	8.16[09]	8.16[09]	1.275	5.81[10]	5.92[08]	611.92	2.71[08]	1.25[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p5d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	7.23[13]	9.42[13]	10.767	4.44[10]	1.92[08]	611.94	1.47[08]	2.63[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p5d	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	7.23[13]	9.40[13]	10.766	2.22[10]	3.99[08]	611.95	3.07[08]	5.48[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	7.23[13]	9.42[13]	10.767	4.44[10]	1.00[09]	612.18	7.70[08]	1.37[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5d	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	7.23[13]	9.40[13]	10.766	2.22[10]	2.05[08]	612.20	1.58[08]	2.81[-16]
2s <sup>2</sup> 4s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	2s2p4s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.90[13]	3.90[13]	3.089	1.96[10]	5.02[09]	614.74	5.02[09]	1.93[-14]
2s <sup>2</sup> 4s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	2s2p4s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.13[13]	4.13[13]	3.078	9.66[09]	2.54[09]	615.06	2.53[09]	9.75[-15]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p8s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	1.21[13]	5.49[13]	15.886	1.38[10]	5.96[08]	620.29	1.31[08]	1.40[-16]
2s <sup>2</sup> 6d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 4p	( <sup>1</sup> D) <sup>2</sup> F <sub>7/2</sub>	1.19[13]	3.45[13]	13.963	2.34[10]	6.38[08]	620.71	2.21[08]	2.86[-16]
2s <sup>2</sup> 6d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 4p	( <sup>1</sup> D) <sup>2</sup> F <sub>5/2</sub>	1.20[13]	3.46[13]	13.960	1.75[10]	4.46[08]	620.79	1.55[08]	2.01[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p6s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2.19[13]	2.19[13]	3.570	1.33[10]	9.56[08]	621.74	9.56[08]	3.50[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p6s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2.02[13]	2.02[13]	3.536	6.77[09]	5.03[08]	622.79	5.03[08]	1.85[-15]
2s <sup>2</sup> 4d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2.61[13]	2.61[13]	5.885	5.93[10]	1.09[09]	625.23	1.09[09]	3.17[-15]
2s <sup>2</sup> 4d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	5.73[12]	5.73[12]	5.862	1.16[10]	1.32[08]	625.93	1.32[08]	3.84[-16]
2s <sup>2</sup> 4d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	1.83[13]	1.83[13]	5.861	3.30[10]	4.27[08]	625.97	4.27[08]	1.24[-15]
2s <sup>2</sup> 4d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	1.83[13]	1.83[13]	5.861	3.30[10]	3.01[08]	625.99	3.01[08]	8.76[-16]
2p <sup>2</sup> 3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p8d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2.58[13]	3.36[13]	16.201	2.91[10]	1.86[08]	626.38	1.43[08]	1.48[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	5.58[13]	5.58[13]	0.218	9.29[09]	4.11[08]	626.94	4.11[08]	2.11[-15]
2s <sup>2</sup> 4d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.28[12]	3.28[12]	5.812	3.52[10]	4.52[08]	627.51	4.51[08]	1.32[-15]
2s <sup>2</sup> 4d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.28[12]	3.28[12]	5.812	3.52[10]	1.49[09]	627.53	1.49[09]	4.36[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p5s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	5.56[13]	5.56[13]	0.185	4.71[09]	1.50[08]	627.64	1.50[08]	7.71[-16]
2s <sup>2</sup> 4d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	5.20[09]	5.20[09]	5.802	2.29[10]	1.21[09]	627.82	5.75[08]	1.68[-15]
2s <sup>2</sup> 5s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	2s2p5s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.89[13]	3.89[13]	9.337	2.09[10]	1.08[10]	630.07	1.08[10]	2.23[-14]
2s <sup>2</sup> 5s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	2s2p5s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	3.93[13]	3.93[13]	9.337	1.05[10]	5.42[09]	630.08	5.42[09]	1.11[-14]
2s <sup>2</sup> 4d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	8.20[13]	8.20[13]	5.692	6.86[10]	1.21[09]	631.35	1.20[09]	3.57[-15]
2s <sup>2</sup> 4d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	8.20[13]	8.20[13]	5.692	6.86[10]	1.07[10]	631.38	1.07[10]	3.17[-14]
2s <sup>2</sup> 4d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	8.34[13]	8.34[13]	5.691	3.45[10]	5.98[09]	631.39	5.97[09]	1.77[-14]
2s <sup>2</sup> 7s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	2s2p7s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	1.81[13]	8.20[13]	14.779	1.29[10]	6.72[09]	631.95	1.48[09]	1.77[-15]
2s <sup>2</sup> 7s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	2s2p7s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	1.84[13]	7.99[13]	14.776	6.43[09]	3.42[09]	632.06	7.88[08]	9.41[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p5d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	7.23[13]	9.42[13]	10.767	4.44[10]	1.46[09]	634.00	1.12[09]	2.00[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p5d	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	7.23[13]	9.40[13]	10.766	2.22[10]	7.19[08]	634.02	5.53[08]	9.86[-16]
2s <sup>2</sup> 5d	( <sup>1</sup> S) <sup>2</sup> D <sub>3/2</sub>	2s2p5d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	7.23[13]	9.42[13]	10.767	4.44[10]	1.24[09]	634.13	9.48[08]	1.69[-15]
2s <sup>2</sup> 5d	( <sup>1</sup> S) <sup>2</sup> D <sub>5/2</sub>	2s2p5d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	7.23[13]	9.42[13]	10.767	4.44[10]	1.11[10]	634.14	8.48[09]	1.51[-14]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{\text{eff}}$
Conf.	$LSJ$	Conf.	$LSJ$	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	$\text{\AA}$	$s^{-1}$	$\text{cm}^3/s$
$2s^25d$	$(^1S) ^2D_{3/2}$	$2s2p5d$	$(^1P) ^2P_{1/2}$	7.23[13]	9.40[13]	10.766	2.22[10]	6.14[09]	634.15	4.72[09]	8.42[-15]
$2s^26d$	$(^1S) ^2D_{3/2}$	$2s2p6d$	$(^1P) ^2P_{1/2}$	4.66[13]	6.20[13]	13.498	1.59[10]	6.05[09]	635.50	4.55[09]	6.17[-15]
$2s^26d$	$(^1S) ^2D_{3/2}$	$2s2p6d$	$(^1P) ^2P_{3/2}$	4.66[13]	6.20[13]	13.498	3.18[10]	1.21[09]	635.50	9.06[08]	1.23[-15]
$2s^26d$	$(^1S) ^2D_{5/2}$	$2s2p6d$	$(^1P) ^2P_{3/2}$	4.66[13]	6.20[13]	13.498	3.18[10]	1.10[10]	635.51	8.23[09]	1.12[-14]
$2s^28g$	$(^1S) ^2G_{7/2}$	$2s2p8g$	$(^1P) ^2H_{9/2}$	2.31[13]	3.41[13]	16.285	3.15[10]	2.24[10]	635.66	1.51[10]	1.55[-14]
$2s^28g$	$(^1S) ^2G_{9/2}$	$2s2p8g$	$(^1P) ^2H_{11/2}$	2.31[13]	3.42[13]	16.285	3.77[10]	2.75[10]	635.66	1.86[10]	1.91[-14]
$2s^28g$	$(^1S) ^2G_{9/2}$	$2s2p8g$	$(^1P) ^2H_{9/2}$	2.31[13]	3.41[13]	16.285	3.15[10]	5.07[08]	635.66	3.43[08]	3.52[-16]
$2s^27d$	$(^1S) ^2D_{3/2}$	$2s2p7d$	$(^1P) ^2F_{3/2}$	3.71[13]	5.11[13]	15.141	2.67[10]	1.22[09]	636.23	8.88[08]	1.02[-15]
$2s^27d$	$(^1S) ^2D_{3/2}$	$2s2p7d$	$(^1P) ^2P_{1/2}$	3.71[13]	5.09[13]	15.141	1.33[10]	6.08[09]	636.24	4.43[09]	5.10[-15]
$2s^27d$	$(^1S) ^2D_{5/2}$	$2s2p7d$	$(^1P) ^2P_{3/2}$	3.71[13]	5.11[13]	15.141	2.67[10]	1.09[10]	636.24	7.95[09]	9.16[-15]
$2s^28d$	$(^1S) ^2D_{5/2}$	$2s2p8d$	$(^1P) ^2P_{3/2}$	2.58[13]	3.36[13]	16.201	2.91[10]	1.14[10]	636.66	8.74[09]	9.05[-15]
$2s^28d$	$(^1S) ^2D_{3/2}$	$2s2p8d$	$(^1P) ^2P_{3/2}$	2.58[13]	3.36[13]	16.201	2.91[10]	1.27[09]	636.66	9.77[08]	1.01[-15]
$2s^28d$	$(^1S) ^2D_{3/2}$	$2s2p8d$	$(^1P) ^2P_{1/2}$	2.58[13]	3.36[13]	16.201	1.46[10]	6.32[09]	636.67	4.86[09]	5.03[-15]
$2s^25g$	$(^1S) ^2G_{7/2}$	$2s2p5g$	$(^1P) ^2F_{7/2}$	2.98[11]	3.13[11]	10.917	3.12[10]	6.20[08]	637.06	5.83[08]	1.02[-15]
$2s^25g$	$(^1S) ^2G_{7/2}$	$2s2p5g$	$(^1P) ^2F_{5/2}$	2.98[11]	3.12[11]	10.917	2.34[10]	1.68[10]	637.07	1.58[10]	2.78[-14]
$2s^25g$	$(^1S) ^2G_{9/2}$	$2s2p5g$	$(^1P) ^2F_{7/2}$	2.98[11]	3.13[11]	10.917	3.12[10]	2.18[10]	637.07	2.05[10]	3.60[-14]
$2s2p3p$	$(^3P) ^2S_{1/2}$	$2s2p4s$	$(^1P) ^2F_{3/2}$	3.90[13]	3.90[13]	3.089	1.96[10]	1.54[09]	637.12	1.54[09]	5.93[-15]
$2s^28g$	$(^1S) ^2G_{7/2}$	$2s2p8g$	$(^1P) ^2F_{5/2}$	3.54[11]	3.78[11]	16.236	2.02[10]	1.77[10]	637.25	1.64[10]	1.69[-14]
$2s^28g$	$(^1S) ^2G_{9/2}$	$2s2p8g$	$(^1P) ^2F_{7/2}$	3.55[11]	3.78[11]	16.236	2.69[10]	2.29[10]	637.25	2.13[10]	2.20[-14]
$2s^28g$	$(^1S) ^2G_{7/2}$	$2s2p8g$	$(^1P) ^2F_{7/2}$	3.55[11]	3.78[11]	16.236	2.69[10]	6.55[08]	637.25	6.09[08]	6.28[-16]
$2s^26g$	$(^1S) ^2G_{7/2}$	$2s2p6g$	$(^1P) ^2F_{5/2}$	4.55[11]	5.02[11]	13.579	2.10[10]	1.71[10]	637.29	1.54[10]	2.07[-14]
$2s^26g$	$(^1S) ^2G_{9/2}$	$2s2p6g$	$(^1P) ^2F_{7/2}$	4.55[11]	5.03[11]	13.579	2.80[10]	2.22[10]	637.29	1.99[10]	2.68[-14]
$2s^26g$	$(^1S) ^2G_{7/2}$	$2s2p6g$	$(^1P) ^2F_{7/2}$	4.55[11]	5.03[11]	13.579	2.80[10]	6.33[08]	637.29	5.68[08]	7.65[-16]
$2s^27i$	$(^1S) ^2I_{11/2}$	$2s2p7i$	$(^1P) ^2H_{9/2}$	1.01[10]	1.03[10]	15.200	3.02[10]	2.83[10]	637.38	2.16[10]	2.48[-14]
$2s^27i$	$(^1S) ^2I_{13/2}$	$2s2p7i$	$(^1P) ^2H_{11/2}$	1.01[10]	1.03[10]	15.200	3.63[10]	3.36[10]	637.38	2.56[10]	2.93[-14]
$2s^27i$	$(^1S) ^2I_{11/2}$	$2s2p7i$	$(^1P) ^2H_{11/2}$	1.01[10]	1.03[10]	15.200	3.63[10]	4.36[08]	637.38	3.33[08]	3.81[-16]
$2s^28i$	$(^1S) ^2I_{11/2}$	$2s2p8i$	$(^1P) ^2H_{9/2}$	1.92[10]	1.94[10]	16.241	3.12[10]	2.99[10]	637.40	2.55[10]	2.63[-14]
$2s^28i$	$(^1S) ^2I_{13/2}$	$2s2p8i$	$(^1P) ^2H_{11/2}$	1.92[10]	1.94[10]	16.241	3.74[10]	3.54[10]	637.40	3.02[10]	3.11[-14]
$2s^28i$	$(^1S) ^2I_{11/2}$	$2s2p8i$	$(^1P) ^2H_{11/2}$	1.92[10]	1.94[10]	16.241	3.74[10]	4.59[08]	637.40	3.92[08]	4.04[-16]
$2s^27i$	$(^1S) ^2I_{11/2}$	$2s2p7i$	$(^1P) ^2K_{13/2}$	1.51[12]	1.52[12]	15.199	4.06[10]	3.75[10]	637.42	3.72[10]	4.26[-14]
$2s^27i$	$(^1S) ^2I_{13/2}$	$2s2p7i$	$(^1P) ^2K_{15/2}$	1.51[12]	1.52[12]	15.199	4.64[10]	4.33[10]	637.42	4.30[10]	4.93[-14]
$2s^27i$	$(^1S) ^2I_{13/2}$	$2s2p7i$	$(^1P) ^2K_{13/2}$	1.51[12]	1.52[12]	15.199	4.06[10]	4.16[08]	637.42	4.14[08]	4.74[-16]
$2s^28i$	$(^1S) ^2I_{11/2}$	$2s2p8i$	$(^1P) ^2K_{13/2}$	2.21[12]	2.22[12]	16.240	3.78[10]	3.57[10]	637.43	3.55[10]	3.66[-14]
$2s^28i$	$(^1S) ^2I_{13/2}$	$2s2p8i$	$(^1P) ^2K_{15/2}$	2.21[12]	2.22[12]	16.240	4.33[10]	4.12[10]	637.43	4.10[10]	4.23[-14]
$2s^28i$	$(^1S) ^2I_{13/2}$	$2s2p8i$	$(^1P) ^2K_{13/2}$	2.21[12]	2.22[12]	16.240	3.78[10]	3.96[08]	637.43	3.94[08]	4.07[-16]
$2s2p3p$	$(^3P) ^2S_{1/2}$	$2s2p4s$	$(^1P) ^2P_{1/2}$	4.13[13]	4.13[13]	3.078	9.66[09]	7.45[08]	637.46	7.45[08]	2.87[-15]
$2s^27i$	$(^1S) ^2S_{1/2}$	$2s2p8s$	$(^1P) ^2P_{3/2}$	1.21[13]	5.49[13]	15.886	1.38[10]	1.03[10]	637.55	2.26[09]	2.41[-15]
$2s^27i$	$(^1S) ^2S_{1/2}$	$2s2p8s$	$(^1P) ^2P_{1/2}$	1.23[13]	5.35[13]	15.886	6.92[09]	5.09[09]	637.56	1.17[09]	1.26[-15]
$2s^27g$	$(^1S) ^2G_{9/2}$	$2s2p7g$	$(^1P) ^2F_{7/2}$	1.94[11]	5.77[11]	15.180	2.67[10]	2.19[10]	637.62	7.35[09]	8.43[-15]
$2s^27g$	$(^1S) ^2G_{7/2}$	$2s2p7g$	$(^1P) ^2F_{7/2}$	1.94[11]	5.77[11]	15.180	2.67[10]	6.25[08]	637.62	2.09[08]	2.40[-16]
$2s^27g$	$(^1S) ^2G_{7/2}$	$2s2p7g$	$(^1P) ^2F_{5/2}$	1.95[11]	5.78[11]	15.180	2.00[10]	1.69[10]	637.63	5.67[09]	6.50[-15]
$2s^28d$	$(^1S) ^2D_{5/2}$	$2s2p8d$	$(^1P) ^2F_{7/2}$	1.58[13]	2.03[13]	16.168	3.23[10]	2.07[10]	637.73	1.61[10]	1.67[-14]
$2s^28d$	$(^1S) ^2D_{3/2}$	$2s2p8d$	$(^1P) ^2F_{5/2}$	1.58[13]	2.04[13]	16.168	2.43[10]	1.45[10]	637.73	1.12[10]	1.17[-14]
$2s^28d$	$(^1S) ^2D_{5/2}$	$2s2p8d$	$(^1P) ^2F_{5/2}$	1.58[13]	2.04[13]	16.168	2.43[10]	1.02[09]	637.73	7.93[08]	8.24[-16]
$2s^27d$	$(^1S) ^2D_{3/2}$	$2s2p7d$	$(^1P) ^2F_{5/2}$	2.90[13]	3.68[13]	15.093	2.63[10]	1.49[10]	637.82	1.17[10]	1.36[-14]
$2s^27d$	$(^1S) ^2D_{5/2}$	$2s2p7d$	$(^1P) ^2F_{7/2}$	2.89[13]	3.66[13]	15.093	3.50[10]	2.12[10]	637.83	1.67[10]	1.94[-14]
$2s^27d$	$(^1S) ^2D_{5/2}$	$2s2p7d$	$(^1P) ^2F_{5/2}$	2.90[13]	3.68[13]	15.093	2.63[10]	1.03[09]	637.83	8.11[08]	9.39[-16]
$2s^25g$	$(^1S) ^2G_{7/2}$	$2s2p5g$	$(^1P) ^2H_{9/2}$	4.19[13]	4.33[13]	10.889	3.78[10]	2.56[10]	638.01	2.48[10]	4.36[-14]
$2s^25g$	$(^1S) ^2G_{9/2}$	$2s2p5g$	$(^1P) ^2H_{11/2}$	4.19[13]	4.34[13]	10.889	4.54[10]	3.14[10]	638.01	3.04[10]	5.35[-14]
$2s^25g$	$(^1S) ^2G_{9/2}$	$2s2p5g$	$(^1P) ^2H_{9/2}$	4.19[13]	4.33[13]	10.889	3.78[10]	5.87[08]	638.01	5.67[08]	1.00[-15]
$2s^26g$	$(^1S) ^2G_{7/2}$	$2s2p6g$	$(^1P) ^2H_{9/2}$	3.63[13]	3.96[13]	13.543	3.26[10]	2.49[10]	638.48	2.29[10]	3.09[-14]
$2s^26g$	$(^1S) ^2G_{9/2}$	$2s2p6g$	$(^1P) ^2H_{11/2}$	3.63[13]	3.96[13]	13.543	3.91[10]	3.06[10]	638.48	2.81[10]	3.79[-14]
$2s^26g$	$(^1S) ^2G_{9/2}$	$2s2p6g$	$(^1P) ^2H_{9/2}$	3.63[13]	3.96[13]	13.543	3.26[10]	5.68[08]	638.48	5.21[08]	7.03[-16]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{eff}$
Conf.	$LSJ$	Conf.	$LSJ$	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	$\text{\AA}$	$s^{-1}$	$cm^3/s$
$2s^26d$	$(^1S) ^2D_{3/2}$	$2s2p6d$	$(^1P) ^2F_{5/2}$	4.59[13]	5.30[13]	13.401	3.89[10]	1.42[10]	638.67	1.23[10]	1.69[-14]
$2s^26d$	$(^1S) ^2D_{5/2}$	$2s2p6d$	$(^1P) ^2F_{7/2}$	4.59[13]	5.29[13]	13.401	5.16[10]	2.05[10]	638.68	1.78[10]	2.44[-14]
$2s^26d$	$(^1S) ^2D_{5/2}$	$2s2p6d$	$(^1P) ^2F_{5/2}$	4.59[13]	5.30[13]	13.401	3.89[10]	1.05[09]	638.68	9.10[08]	1.25[-15]
$2s^26s$	$(^1S) ^2S_{1/2}$	$2s2p6s$	$(^1P) ^2P_{1/2}$	2.69[13]	3.32[13]	12.658	9.48[09]	5.21[09]	638.77	4.22[09]	6.22[-15]
$2s^26s$	$(^1S) ^2S_{1/2}$	$2s2p6s$	$(^1P) ^2P_{3/2}$	2.67[13]	3.30[13]	12.658	1.89[10]	1.04[10]	638.77	8.45[09]	1.25[-14]
$2s2p4p$	$(^3P) ^2P_{3/2}$	$2s2p6d$	$(^1P) ^2F_{5/2}$	4.59[13]	5.30[13]	13.401	3.89[10]	1.21[08]	638.91	1.05[08]	1.44[-16]
$2s^25d$	$(^1S) ^2D_{3/2}$	$2s2p5d$	$(^1P) ^2F_{5/2}$	1.19[14]	1.40[14]	10.619	4.99[10]	1.46[10]	638.94	1.24[10]	2.25[-14]
$2s^25d$	$(^1S) ^2D_{5/2}$	$2s2p5d$	$(^1P) ^2F_{5/2}$	1.19[14]	1.40[14]	10.619	4.99[10]	1.01[09]	638.95	8.62[08]	1.56[-15]
$2s^25d$	$(^1S) ^2D_{5/2}$	$2s2p5d$	$(^1P) ^2F_{7/2}$	1.19[14]	1.40[14]	10.619	6.61[10]	2.08[10]	638.96	1.77[10]	3.20[-14]
$2s^24d$	$(^1S) ^2D_{3/2}$	$2s2p4d$	$(^1P) ^2D_{5/2}$	9.78[11]	9.78[11]	5.434	1.05[11]	5.93[08]	639.74	5.83[08]	1.77[-15]
$2s^24d$	$(^1S) ^2D_{5/2}$	$2s2p4d$	$(^1P) ^2D_{5/2}$	9.78[11]	9.78[11]	5.434	1.05[11]	1.41[10]	639.76	1.38[10]	4.20[-14]
$2s^24d$	$(^1S) ^2D_{3/2}$	$2s2p4d$	$(^1P) ^2D_{3/2}$	1.86[09]	1.86[09]	5.432	6.95[10]	8.72[09]	639.82	8.43[08]	2.56[-15]
$2s^27g$	$(^1S) ^2G_{7/2}$	$2s2p7g$	$(^1P) ^2H_{9/2}$	2.02[13]	3.87[13]	15.109	3.03[10]	2.22[10]	639.95	1.16[10]	1.34[-14]
$2s^27g$	$(^1S) ^2G_{9/2}$	$2s2p7g$	$(^1P) ^2H_{11/2}$	2.02[13]	3.87[13]	15.109	3.64[10]	2.73[10]	639.95	1.42[10]	1.64[-14]
$2s^27g$	$(^1S) ^2G_{9/2}$	$2s2p7g$	$(^1P) ^2H_{9/2}$	2.02[13]	3.87[13]	15.109	3.03[10]	5.08[08]	639.95	2.65[08]	3.06[-16]
$2s2p3p$	$(^3P) ^2D_{3/2}$	$2p^23p$	$(^1D) ^2P_{1/2}$	2.98[13]	2.98[13]	1.790	1.67[10]	2.37[08]	640.43	2.37[08]	1.04[-15]
$2s^24d$	$(^1S) ^2D_{5/2}$	$2s2p4d$	$(^1P) ^2F_{7/2}$	3.04[14]	3.04[14]	5.411	8.42[10]	2.18[10]	640.55	2.18[10]	6.65[-14]
$2s^24d$	$(^1S) ^2D_{3/2}$	$2s2p4d$	$(^1P) ^2F_{5/2}$	3.01[14]	3.01[14]	5.409	6.22[10]	1.55[10]	640.56	1.55[10]	4.73[-14]
$2s^24d$	$(^1S) ^2D_{5/2}$	$2s2p4d$	$(^1P) ^2F_{5/2}$	3.01[14]	3.01[14]	5.409	6.22[10]	7.29[08]	640.59	7.29[08]	2.22[-15]
$2s2p3p$	$(^3P) ^2D_{5/2}$	$2p^23p$	$(^1D) ^2P_{3/2}$	3.04[13]	3.04[13]	1.803	3.31[10]	4.13[08]	641.10	4.13[08]	1.80[-15]
$2s^24d$	$(^1S) ^2D_{5/2}$	$2s2p7s$	$(^3P) ^2P_{3/2}$	3.64[13]	3.64[13]	5.389	1.09[10]	2.47[08]	641.25	2.47[08]	7.54[-16]
$2s^24d$	$(^1S) ^2D_{3/2}$	$2s2p7s$	$(^3P) ^2P_{1/2}$	3.50[13]	3.50[13]	5.352	5.29[09]	1.18[08]	642.48	1.18[08]	3.63[-16]
$2s2p3p$	$(^3P) ^4P_{5/2}$	$2s2p5d$	$(^3P) ^4P_{5/2}$	3.86[09]	3.86[09]	1.328	4.41[10]	2.47[09]	643.25	8.49[08]	3.89[-15]
$2s2p3p$	$(^3P) ^4P_{3/2}$	$2s2p5d$	$(^3P) ^2D_{5/2}$	2.13[10]	2.13[10]	1.299	6.23[10]	4.35[08]	643.65	2.93[08]	1.35[-15]
$2s2p3p$	$(^3P) ^4P_{1/2}$	$2s2p5d$	$(^3P) ^4D_{1/2}$	9.14[08]	9.14[08]	1.274	2.11[10]	1.28[09]	644.09	1.02[08]	4.71[-16]
$2s2p3p$	$(^3P) ^4P_{1/2}$	$2s2p5d$	$(^3P) ^4D_{3/2}$	1.25[09]	1.25[09]	1.274	4.10[10]	1.52[09]	644.10	1.65[08]	7.60[-16]
$2s2p3p$	$(^3P) ^4P_{5/2}$	$2s2p5d$	$(^3P) ^2D_{5/2}$	2.13[10]	2.13[10]	1.299	6.23[10]	2.74[08]	644.25	1.84[08]	8.48[-16]
$2s2p3p$	$(^3P) ^4P_{5/2}$	$2s2p5d$	$(^3P) ^4D_{7/2}$	8.99[09]	8.99[09]	1.294	8.35[10]	5.61[09]	644.40	2.60[09]	1.19[-14]
$2s2p3p$	$(^3P) ^4P_{3/2}$	$2s2p5d$	$(^3P) ^4D_{5/2}$	8.16[09]	8.16[09]	1.275	5.81[10]	3.15[09]	644.46	1.44[09]	6.63[-15]
$2s2p3p$	$(^3P) ^4P_{3/2}$	$2s2p5d$	$(^3P) ^4D_{3/2}$	1.25[09]	1.25[09]	1.274	4.10[10]	1.03[09]	644.48	1.12[08]	5.15[-16]
$2s2p3p$	$(^3P) ^2D_{3/2}$	$2s2p5d$	$(^3P) ^2F_{5/2}$	6.71[12]	6.71[12]	1.570	4.32[10]	2.71[09]	647.82	2.71[09]	1.21[-14]
$2s2p3p$	$(^3P) ^2D_{5/2}$	$2s2p5d$	$(^3P) ^2F_{7/2}$	8.87[12]	8.87[12]	1.594	6.69[10]	6.60[09]	648.12	6.59[09]	2.94[-14]
$2s2p3p$	$(^3P) ^2D_{5/2}$	$2s2p5g$	$(^3P) ^4F_{7/2}$	7.53[11]	7.53[11]	1.592	1.42[10]	5.67[08]	648.19	5.66[08]	2.53[-15]
$2s2p3p$	$(^3P) ^2D_{3/2}$	$2p^23p$	$(^1D) ^2D_{3/2}$	6.73[10]	6.73[10]	1.558	1.70[10]	1.30[09]	648.21	1.22[09]	5.47[-15]
$2s2p3p$	$(^3P) ^2D_{3/2}$	$2p^23p$	$(^1D) ^2D_{5/2}$	2.80[12]	2.80[12]	1.553	3.41[10]	2.39[09]	648.37	2.38[09]	1.07[-14]
$2s2p3p$	$(^3P) ^2D_{5/2}$	$2s2p5d$	$(^3P) ^2F_{5/2}$	6.71[12]	6.71[12]	1.570	4.32[10]	1.77[09]	648.94	1.77[09]	7.91[-15]
$2s2p3p$	$(^3P) ^2D_{5/2}$	$2p^23p$	$(^1D) ^2D_{3/2}$	6.73[10]	6.73[10]	1.558	1.70[10]	1.34[08]	649.33	1.26[08]	5.63[-16]
$2s2p3p$	$(^3P) ^2D_{5/2}$	$2p^23p$	$(^1D) ^2D_{5/2}$	2.80[12]	2.80[12]	1.553	3.41[10]	7.45[08]	649.49	7.44[08]	3.33[-15]
$2s2p3p$	$(^1P) ^2D_{3/2}$	$2s2p5s$	$(^1P) ^2P_{1/2}$	3.93[13]	3.93[13]	9.337	1.05[10]	3.74[08]	651.57	3.74[08]	7.70[-16]
$2s2p3p$	$(^1P) ^2D_{5/2}$	$2s2p5s$	$(^1P) ^2P_{3/2}$	3.89[13]	3.89[13]	9.337	2.09[10]	6.89[08]	651.65	6.89[08]	1.42[-15]
$2s^24s$	$(^1S) ^2S_{1/2}$	$2p^23p$	$(^1D) ^2P_{3/2}$	3.04[13]	3.04[13]	1.803	3.31[10]	4.83[09]	656.59	4.83[09]	2.11[-14]
$2s^24s$	$(^1S) ^2S_{1/2}$	$2p^23p$	$(^1D) ^2P_{1/2}$	2.98[13]	2.98[13]	1.790	1.67[10]	2.38[09]	657.04	2.38[09]	1.04[-14]
$2s2p3p$	$(^3P) ^2D_{5/2}$	$2s2p5d$	$(^3P) ^2D_{5/2}$	2.13[10]	2.13[10]	1.299	6.23[10]	3.90[08]	658.28	2.62[08]	1.21[-15]
$2s2p3p$	$(^1P) ^2P_{1/2}$	$2s2p5s$	$(^1P) ^2P_{3/2}$	3.89[13]	3.89[13]	9.337	2.09[10]	2.38[08]	658.38	2.38[08]	4.89[-16]
$2s2p3p$	$(^1P) ^2P_{1/2}$	$2s2p5s$	$(^1P) ^2P_{1/2}$	3.93[13]	3.93[13]	9.337	1.05[10]	5.03[08]	658.40	5.03[08]	1.03[-15]
$2s2p3p$	$(^1P) ^2P_{3/2}$	$2s2p5s$	$(^1P) ^2P_{3/2}$	3.89[13]	3.89[13]	9.337	2.09[10]	1.23[09]	658.67	1.22[09]	2.52[-15]
$2s2p3p$	$(^1P) ^2P_{3/2}$	$2s2p5s$	$(^1P) ^2P_{1/2}$	3.93[13]	3.93[13]	9.337	1.05[10]	2.57[08]	658.69	2.57[08]	5.29[-16]
$2s2p4p$	$(^3P) ^2D_{3/2}$	$2p^24p$	$(^1D) ^2F_{5/2}$	1.20[13]	3.46[13]	13.960	1.75[10]	3.57[08]	660.06	1.24[08]	1.61[-16]
$2s2p4p$	$(^3P) ^2D_{5/2}$	$2p^24p$	$(^1D) ^2F_{7/2}$	1.19[13]	3.45[13]	13.963	2.34[10]	5.06[08]	660.96	1.75[08]	2.27[-16]
$2s^24s$	$(^1S) ^2S_{1/2}$	$2s2p5d$	$(^3P) ^2P_{1/2}$	1.15[10]	1.15[10]	1.632	1.69[10]	2.57[08]	662.61	1.48[08]	6.59[-16]
$2s^24s$	$(^1S) ^2S_{1/2}$	$2s2p5d$	$(^3P) ^2P_{3/2}$	9.17[09]	9.17[09]	1.615	3.33[10]	5.00[08]	663.22	2.62[08]	1.17[-15]
$2s2p3p$	$(^3P) ^2S_{1/2}$	$2p^23p$	$(^1D) ^2P_{3/2}$	3.04[13]	3.04[13]	1.803	3.31[10]	2.07[08]	682.18	2.07[08]	9.04[-16]
$2s2p3p$	$(^3P) ^2S_{1/2}$	$2p^23p$	$(^1D) ^2P_{1/2}$	2.98[13]	2.98[13]	1.790	1.67[10]	1.03[08]	682.67	1.03[08]	4.51[-16]

Low level		Upper level		$A_a$ s <sup>-1</sup>	$\Sigma A_a$ s <sup>-1</sup>	$E_S$ eV	$\Sigma gA_r$ s <sup>-1</sup>	$gA_r$ s <sup>-1</sup>	$\lambda$ Å	$Q_d$ s <sup>-1</sup>	$C_{S}^{\text{eff}}$ cm <sup>3</sup> /s
Conf.	LSJ	Conf.	LSJ								
2s2p3p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p5s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.89[13]	3.89[13]	9.337	2.09[10]	4.77[08]	683.99	4.77[08]	9.82[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p5s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	3.93[13]	3.93[13]	9.337	1.05[10]	2.31[08]	684.01	2.31[08]	4.76[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	1.15[10]	1.15[10]	1.632	1.69[10]	7.42[08]	688.68	4.28[08]	1.90[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	9.17[09]	9.17[09]	1.615	3.33[10]	1.44[09]	689.34	7.57[08]	3.37[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> F <sub>7/2</sub>	3.38[13]	3.38[13]	0.413	4.30[10]	1.29[08]	690.75	1.29[08]	6.46[-16]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p5s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	5.58[13]	5.58[13]	0.218	9.29[09]	6.24[08]	698.33	6.24[08]	3.20[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p5s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	5.56[13]	5.56[13]	0.185	4.71[09]	3.25[08]	698.35	3.25[08]	1.67[-15]
2s <sup>2</sup> 5s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	6.59[12]	6.59[12]	6.988	1.58[10]	2.01[08]	715.49	2.01[08]	5.24[-16]
2s <sup>2</sup> 4s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	2s2p5s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	5.58[13]	5.58[13]	0.218	9.29[09]	1.28[08]	716.75	1.28[08]	6.56[-16]
2s <sup>2</sup> 5s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.08[12]	3.08[12]	6.893	3.50[10]	1.54[08]	719.44	1.54[08]	4.04[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 4p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	5.04[10]	2.18[11]	10.803	1.88[10]	5.32[08]	736.60	1.18[08]	2.09[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 4p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	5.04[10]	2.18[11]	10.803	1.88[10]	1.12[09]	737.66	2.49[08]	4.42[-16]
2s <sup>2</sup> 8g	( <sup>1</sup> S) <sup>2</sup> G <sub>7/2</sub>	2s2p6g	( <sup>1</sup> P) <sup>2</sup> H <sub>9/2</sub>	3.63[13]	3.96[13]	13.543	3.26[10]	1.42[08]	739.63	1.31[08]	1.76[-16]
2s <sup>2</sup> 8g	( <sup>1</sup> S) <sup>2</sup> G <sub>9/2</sub>	2s2p6g	( <sup>1</sup> P) <sup>2</sup> H <sub>11/2</sub>	3.63[13]	3.96[13]	13.543	3.91[10]	1.75[08]	739.63	1.60[08]	2.16[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> S) <sup>2</sup> P <sub>1/2</sub>	5.73[12]	5.73[12]	6.992	7.13[09]	2.78[09]	743.16	2.77[09]	7.21[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	6.59[12]	6.59[12]	6.988	1.58[10]	6.14[08]	743.32	6.13[08]	1.60[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	6.59[12]	6.59[12]	6.988	1.58[10]	5.70[09]	743.45	5.70[09]	1.48[-14]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	6.17[12]	6.17[12]	6.920	4.74[10]	3.46[08]	746.49	3.46[08]	9.06[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.17[12]	4.17[12]	6.899	1.94[10]	1.94[09]	747.30	1.93[09]	5.08[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p5s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	5.58[13]	5.58[13]	0.218	9.29[09]	7.46[08]	747.36	7.46[08]	3.82[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	5.46[12]	5.46[12]	6.896	3.26[10]	1.99[08]	747.46	1.99[08]	5.22[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.08[12]	3.08[12]	6.893	3.50[10]	2.26[08]	747.58	2.26[08]	5.93[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.08[12]	3.08[12]	6.893	3.50[10]	2.61[09]	747.71	2.60[09]	6.82[-15]
2p <sup>2</sup> 3s	( <sup>1</sup> D) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 4p	( <sup>1</sup> D) <sup>2</sup> F <sub>5/2</sub>	1.20[13]	3.46[13]	13.960	1.75[10]	3.54[09]	748.68	1.23[09]	1.59[-15]
2p <sup>2</sup> 3s	( <sup>1</sup> D) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 4p	( <sup>1</sup> D) <sup>2</sup> F <sub>7/2</sub>	1.19[13]	3.45[13]	13.963	2.34[10]	5.03[09]	748.71	1.74[09]	2.26[-15]
2s2p3p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p5s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	5.56[13]	5.56[13]	0.185	4.71[09]	3.82[08]	748.87	3.82[08]	1.96[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> S) <sup>2</sup> P <sub>1/2</sub>	5.73[12]	5.73[12]	6.992	7.13[09]	9.07[08]	752.06	9.06[08]	2.36[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	6.59[12]	6.59[12]	6.988	1.58[10]	4.89[08]	752.23	4.89[08]	1.27[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> S) <sup>2</sup> P <sub>1/2</sub>	5.73[12]	5.73[12]	6.992	7.13[09]	4.16[08]	752.43	4.16[08]	1.08[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	6.59[12]	6.59[12]	6.988	1.58[10]	2.63[09]	752.60	2.63[09]	6.83[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.17[12]	4.17[12]	6.899	1.94[10]	4.47[08]	756.30	4.46[08]	1.17[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.08[12]	3.08[12]	6.893	3.50[10]	2.03[08]	756.59	2.03[08]	5.32[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.17[12]	4.17[12]	6.899	1.94[10]	2.01[08]	756.68	2.00[08]	5.26[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.08[12]	3.08[12]	6.893	3.50[10]	7.59[08]	756.97	7.57[08]	1.99[-15]
2s <sup>2</sup> 5s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	8.20[13]	8.20[13]	5.692	6.86[10]	3.23[08]	773.34	3.23[08]	9.58[-16]
2s <sup>2</sup> 5s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	8.34[13]	8.34[13]	5.691	3.45[10]	1.65[08]	773.39	1.65[08]	4.89[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.17[12]	4.17[12]	6.899	1.94[10]	2.17[08]	790.30	2.17[08]	5.69[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.08[12]	3.08[12]	6.893	3.50[10]	3.84[08]	790.61	3.83[08]	1.01[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2.61[13]	2.61[13]	5.885	5.93[10]	4.94[08]	796.11	4.94[08]	1.43[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	1.83[13]	1.83[13]	5.861	3.30[10]	2.64[08]	797.20	2.64[08]	7.69[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.28[12]	3.28[12]	5.812	3.52[10]	1.36[08]	799.84	1.36[08]	3.97[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p5d	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	1.19[14]	1.40[14]	10.619	4.99[10]	1.29[08]	802.85	1.09[08]	1.98[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p5d	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	1.19[14]	1.40[14]	10.619	6.61[10]	1.82[08]	804.35	1.55[08]	2.81[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	8.34[13]	8.34[13]	5.691	3.45[10]	2.82[08]	806.01	2.82[08]	8.34[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	8.20[13]	8.20[13]	5.692	6.86[10]	4.83[08]	806.11	4.82[08]	1.43[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.28[12]	3.28[12]	5.812	3.52[10]	6.06[08]	810.45	6.05[08]	1.77[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	5.20[09]	5.20[09]	5.802	2.29[10]	3.77[08]	810.53	1.80[08]	5.26[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	8.20[13]	8.20[13]	5.692	6.86[10]	4.74[08]	816.44	4.74[08]	1.40[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	8.34[13]	8.34[13]	5.691	3.45[10]	1.01[09]	816.49	1.01[09]	2.99[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	8.20[13]	8.20[13]	5.692	6.86[10]	2.50[09]	816.88	2.50[09]	7.40[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	8.34[13]	8.34[13]	5.691	3.45[10]	4.85[08]	816.93	4.85[08]	1.44[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	9.78[11]	9.78[11]	5.434	1.05[11]	2.49[08]	819.67	2.45[08]	7.44[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	1.86[09]	1.86[09]	5.432	6.95[10]	1.42[09]	819.80	1.37[08]	4.18[-16]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{\text{eff}}$
Conf.	$LSJ$	Conf.	$LSJ$	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	$\text{\AA}$	$s^{-1}$	$\text{cm}^3/s$
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	9.78[11]	9.78[11]	5.434	1.05[11]	2.04[09]	819.83	2.00[09]	6.09[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	3.01[14]	3.01[14]	5.409	6.22[10]	7.00[09]	821.02	7.00[09]	2.13[-14]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	3.04[14]	3.04[14]	5.411	8.42[10]	1.02[10]	821.11	1.02[10]	3.11[-14]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	3.01[14]	3.01[14]	5.409	6.22[10]	6.19[08]	821.18	6.19[08]	1.89[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	1.86[09]	1.86[09]	5.432	6.95[10]	3.11[09]	830.65	3.00[08]	9.13[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	9.78[11]	9.78[11]	5.434	1.05[11]	5.63[09]	830.97	5.54[09]	1.68[-14]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	8.20[13]	8.20[13]	5.692	6.86[10]	2.69[09]	856.19	2.69[09]	7.97[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	8.34[13]	8.34[13]	5.691	3.45[10]	1.33[09]	856.25	1.33[09]	3.94[-15]
2p <sup>2</sup> 3s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 4p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	5.04[10]	2.18[11]	10.803	1.88[10]	1.70[09]	859.64	3.76[08]	6.68[-16]
2p <sup>2</sup> 3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 4p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	5.04[10]	2.18[11]	10.803	1.88[10]	3.41[09]	861.24	7.55[08]	1.34[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p7s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.64[13]	3.64[13]	5.389	1.09[10]	1.40[08]	874.46	1.40[08]	4.27[-16]
2s <sup>2</sup> 8g	( <sup>1</sup> S) <sup>2</sup> G <sub>7/2</sub>	2s2p5g	( <sup>1</sup> P) <sup>2</sup> H <sub>9/2</sub>	4.19[13]	4.33[13]	10.889	3.78[10]	2.22[08]	878.79	2.15[08]	3.79[-16]
2s <sup>2</sup> 8g	( <sup>1</sup> S) <sup>2</sup> G <sub>9/2</sub>	2s2p5g	( <sup>1</sup> P) <sup>2</sup> H <sub>11/2</sub>	4.19[13]	4.34[13]	10.889	4.54[10]	2.73[08]	878.79	2.64[08]	4.65[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p6s	( <sup>3</sup> P) <sup>2</sup> F <sub>3/2</sub>	2.19[13]	2.19[13]	3.570	1.33[10]	1.48[08]	935.10	1.48[08]	5.42[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	6.59[12]	6.59[12]	6.988	1.58[10]	1.40[08]	954.26	1.40[08]	3.65[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p4s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.90[13]	3.90[13]	3.089	1.96[10]	2.87[08]	970.10	2.87[08]	1.10[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p4s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.90[13]	3.90[13]	3.089	1.96[10]	2.40[09]	970.32	2.40[09]	9.22[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p4s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.13[13]	4.13[13]	3.078	9.66[09]	1.32[09]	970.88	1.32[09]	5.09[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p4s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.90[13]	3.90[13]	3.089	1.96[10]	4.40[08]	985.97	4.40[08]	1.69[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p4s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.13[13]	4.13[13]	3.078	9.66[09]	1.82[08]	986.13	1.82[08]	7.02[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p4s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.13[13]	4.13[13]	3.078	9.66[09]	1.03[08]	986.78	1.03[08]	3.95[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p6s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2.19[13]	2.19[13]	3.570	1.33[10]	1.35[08]	1003.18	1.35[08]	4.95[-16]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	1.25[10]	1.25[10]	6.837	1.79[10]	1.56[08]	1016.84	1.32[08]	3.48[-16]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	5.83[10]	5.83[10]	6.781	4.12[09]	1.90[08]	1018.20	1.87[08]	4.98[-16]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	8.83[10]	8.83[10]	6.795	5.49[09]	2.79[08]	1018.39	2.77[08]	7.35[-16]
2s <sup>2</sup> 5s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> P <sub>3/2</sub>	3.04[13]	3.04[13]	1.803	3.31[10]	3.55[08]	1020.95	3.54[08]	1.55[-15]
2s <sup>2</sup> 5s	( <sup>1</sup> S) <sup>2</sup> S <sub>1/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> P <sub>1/2</sub>	2.98[13]	2.98[13]	1.790	1.67[10]	1.77[08]	1022.05	1.77[08]	7.73[-16]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> S <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	8.35[09]	8.35[09]	6.805	1.08[10]	1.32[08]	1035.68	1.08[08]	2.87[-16]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	8.58[10]	8.58[10]	6.843	1.38[10]	2.78[08]	1057.22	2.70[08]	7.14[-16]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	1.25[10]	1.25[10]	6.837	1.79[10]	5.80[08]	1057.77	4.92[08]	1.30[-15]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>4</sup> D <sub>1/2</sub>	1.53[10]	1.53[10]	6.810	5.43[09]	1.61[08]	1057.80	1.37[08]	3.63[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	5.46[12]	5.46[12]	6.896	3.26[10]	5.65[08]	1057.95	5.64[08]	1.48[-15]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	5.78[09]	5.78[09]	6.808	9.38[09]	2.06[08]	1057.97	1.47[08]	3.88[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	6.17[12]	6.17[12]	6.920	4.74[10]	1.02[09]	1058.34	1.02[09]	2.66[-15]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	8.35[09]	8.35[09]	6.805	1.08[10]	2.53[08]	1059.37	2.08[08]	5.51[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	8.20[13]	8.20[13]	5.692	6.86[10]	1.26[08]	1060.02	1.26[08]	3.73[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	5.46[12]	5.46[12]	6.896	3.26[10]	1.29[08]	1060.54	1.29[08]	3.39[-16]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	8.83[10]	8.83[10]	6.795	5.49[09]	1.18[08]	1061.61	1.17[08]	3.10[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	6.77[11]	6.77[11]	6.848	1.51[10]	1.37[08]	1062.28	1.36[08]	3.59[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	1.29[11]	1.29[11]	6.836	1.08[10]	1.06[08]	1063.41	1.04[08]	2.75[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> P <sub>3/2</sub>	3.04[13]	3.04[13]	1.803	3.31[10]	1.38[08]	1078.57	1.37[08]	6.01[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> P <sub>3/2</sub>	3.04[13]	3.04[13]	1.803	3.31[10]	1.54[09]	1078.84	1.53[09]	6.71[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> P <sub>1/2</sub>	2.98[13]	2.98[13]	1.790	1.67[10]	8.06[08]	1079.80	8.05[08]	3.52[-15]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	9.78[11]	9.78[11]	5.434	1.05[11]	2.40[08]	1083.88	2.36[08]	7.17[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.64[13]	3.64[13]	5.389	1.09[10]	1.21[08]	1088.16	1.21[08]	3.69[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p8s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2.44[13]	2.44[13]	6.592	5.56[09]	3.01[08]	1088.85	3.01[08]	8.15[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p8s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2.34[13]	2.34[13]	6.553	2.82[09]	1.69[08]	1089.80	1.68[08]	4.58[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> P <sub>3/2</sub>	3.04[13]	3.04[13]	1.803	3.31[10]	1.78[08]	1097.43	1.78[08]	7.79[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> P <sub>3/2</sub>	3.04[13]	3.04[13]	1.803	3.31[10]	1.05[09]	1098.22	1.05[09]	4.60[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> P <sub>1/2</sub>	2.98[13]	2.98[13]	1.790	1.67[10]	4.03[08]	1098.69	4.03[08]	1.76[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> P <sub>1/2</sub>	2.98[13]	2.98[13]	1.790	1.67[10]	2.18[08]	1099.49	2.18[08]	9.55[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	6.71[12]	6.71[12]	1.570	4.32[10]	1.26[08]	1100.96	1.26[08]	5.63[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	6.71[12]	6.71[12]	1.570	4.32[10]	4.34[08]	1101.24	4.34[08]	1.94[-15]



Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_{S}^{\text{eff}}$
Conf.	<i>LSJ</i>	Conf.	<i>LSJ</i>	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	$\text{\AA}$	$s^{-1}$	$\text{cm}^3/s$
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> D <sub>3/2</sub>	6.73[10]	6.73[10]	1.558	1.70[10]	1.12[09]	1102.08	1.06[09]	4.73[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> D <sub>5/2</sub>	2.80[12]	2.80[12]	1.553	3.41[10]	1.26[09]	1102.83	1.26[09]	5.64[-15]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	5.65[10]	5.65[10]	5.758	2.83[10]	2.92[08]	1115.58	2.75[08]	8.08[-16]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> D <sub>1/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	3.42[08]	3.42[08]	5.686	2.57[09]	2.98[08]	1117.84	1.04[08]	3.07[-16]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2.04[11]	2.04[11]	5.693	5.05[09]	4.81[08]	1118.03	4.79[08]	1.42[-15]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2.99[11]	2.99[11]	5.707	7.06[09]	7.04[08]	1118.27	7.02[08]	2.08[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	6.71[12]	6.71[12]	1.570	4.32[10]	2.11[08]	1121.44	2.11[08]	9.43[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> D <sub>3/2</sub>	6.73[10]	6.73[10]	1.558	1.70[10]	5.01[08]	1121.77	4.71[08]	2.11[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> D <sub>5/2</sub>	2.80[12]	2.80[12]	1.553	3.41[10]	5.90[08]	1123.09	5.89[08]	2.64[-15]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.17[12]	4.17[12]	6.899	1.94[10]	3.09[08]	1127.03	3.08[08]	8.10[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.08[12]	3.08[12]	6.893	3.50[10]	5.87[08]	1127.67	5.85[08]	1.54[-15]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> S <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	1.05[10]	1.05[10]	5.769	1.78[10]	1.74[08]	1133.78	1.35[08]	3.97[-16]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> S <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	1.05[10]	1.05[10]	5.731	1.78[10]	2.24[08]	1137.74	1.74[08]	5.14[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2.13[10]	2.13[10]	1.299	6.23[10]	3.64[08]	1149.62	2.45[08]	1.12[-15]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	5.73[12]	5.73[12]	5.862	1.16[10]	1.58[08]	1160.29	1.58[08]	4.61[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	1.83[13]	1.83[13]	5.861	3.30[10]	4.30[08]	1160.44	4.30[08]	1.25[-15]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2.61[13]	2.61[13]	5.885	5.93[10]	1.07[09]	1160.91	1.06[09]	3.09[-15]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	1.05[10]	1.05[10]	5.769	1.78[10]	4.13[08]	1163.87	3.22[08]	9.46[-16]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p7s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	4.50[11]	4.50[11]	5.267	3.38[09]	1.75[08]	1164.49	1.74[08]	5.38[-16]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	5.65[10]	5.65[10]	5.758	2.83[10]	7.78[08]	1165.04	7.32[08]	2.15[-15]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.28[12]	3.28[12]	5.812	3.52[10]	1.30[08]	1165.73	1.30[08]	3.80[-16]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	1.05[10]	1.05[10]	5.731	1.78[10]	3.87[08]	1166.39	3.01[08]	8.89[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	2s2p8g	( <sup>3</sup> P) <sup>4</sup> G <sub>11/2</sub>	1.88[08]	1.88[08]	6.904	3.27[09]	4.04[08]	1166.97	1.65[08]	4.33[-16]
2p <sup>2</sup> 3s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> S) <sup>2</sup> P <sub>1/2</sub>	5.73[12]	5.73[12]	6.992	7.13[09]	1.90[08]	1168.42	1.90[08]	4.94[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2s2p8g	( <sup>3</sup> P) <sup>4</sup> G <sub>5/2</sub>	1.42[09]	1.42[09]	6.864	1.61[09]	4.04[08]	1170.00	3.39[08]	8.94[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p8g	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	1.95[08]	1.95[08]	6.864	2.12[09]	4.39[08]	1170.16	1.86[08]	4.90[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> P <sub>3/2</sub>	3.04[13]	3.04[13]	1.803	3.31[10]	1.77[09]	1170.48	1.77[09]	7.72[-15]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	2s2p8g	( <sup>3</sup> P) <sup>4</sup> G <sub>11/2</sub>	1.88[08]	1.88[08]	6.867	3.27[09]	6.68[08]	1171.08	2.73[08]	7.19[-16]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p8g	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	1.12[08]	1.12[08]	6.867	2.72[09]	5.28[08]	1171.43	1.54[08]	4.06[-16]
2p <sup>2</sup> 3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> S) <sup>2</sup> P <sub>3/2</sub>	6.59[12]	6.59[12]	6.988	1.58[10]	4.90[08]	1171.77	4.90[08]	1.27[-15]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> S <sub>1/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> P <sub>1/2</sub>	2.98[13]	2.98[13]	1.790	1.67[10]	8.99[08]	1171.93	8.98[08]	3.93[-15]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p8g	( <sup>3</sup> P) <sup>4</sup> H <sub>7/2</sub>	1.67[09]	1.67[09]	6.849	2.20[09]	3.02[08]	1172.44	2.60[08]	6.85[-16]
2p <sup>2</sup> 3s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	1.29[11]	1.29[11]	6.836	1.08[10]	3.19[08]	1185.86	3.13[08]	8.26[-16]
2p <sup>2</sup> 3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	6.77[11]	6.77[11]	6.848	1.51[10]	3.93[08]	1187.49	3.92[08]	1.03[-15]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p8g	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	9.38[08]	9.38[08]	6.906	2.21[09]	2.23[08]	1193.66	1.73[08]	4.53[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p8g	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	3.85[10]	3.85[10]	6.909	1.90[09]	1.08[08]	1194.48	1.07[08]	2.80[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p8g	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	1.48[10]	1.48[10]	6.906	1.73[09]	2.38[08]	1194.87	2.33[08]	6.12[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> G <sub>9/2</sub>	2s2p8g	( <sup>3</sup> P) <sup>4</sup> G <sub>11/2</sub>	1.88[08]	1.88[08]	6.904	3.27[09]	5.99[08]	1196.92	2.44[08]	6.41[-16]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p8g	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	9.38[08]	9.38[08]	6.906	2.21[09]	2.70[08]	1197.39	2.08[08]	5.46[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p8g	( <sup>3</sup> P) <sup>4</sup> H <sub>7/2</sub>	1.67[09]	1.67[09]	6.872	2.20[09]	2.75[08]	1197.61	2.36[08]	6.21[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> G <sub>5/2</sub>	2s2p8g	( <sup>3</sup> P) <sup>4</sup> H <sub>7/2</sub>	1.67[09]	1.67[09]	6.872	2.20[09]	2.93[08]	1198.00	2.51[08]	6.62[-16]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p8g	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	3.85[10]	3.85[10]	6.909	1.90[09]	3.49[08]	1199.11	3.46[08]	9.08[-16]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p8g	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	1.48[10]	1.48[10]	6.906	1.73[09]	1.11[08]	1199.51	1.09[08]	2.85[-16]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	2s2p8g	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	1.12[08]	1.12[08]	6.904	2.72[09]	3.78[08]	1199.97	1.11[08]	2.90[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> G <sub>5/2</sub>	2s2p8g	( <sup>3</sup> P) <sup>4</sup> H <sub>7/2</sub>	1.67[09]	1.67[09]	6.849	2.20[09]	2.66[08]	1200.64	2.28[08]	6.02[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> G <sub>9/2</sub>	2s2p8g	( <sup>3</sup> P) <sup>4</sup> G <sub>11/2</sub>	1.88[08]	1.88[08]	6.867	3.27[09]	4.36[08]	1201.24	1.78[08]	4.69[-16]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p8g	( <sup>3</sup> P) <sup>4</sup> H <sub>7/2</sub>	1.67[09]	1.67[09]	6.872	2.20[09]	1.37[08]	1201.36	1.18[08]	3.10[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> F <sub>5/2</sub>	3.01[14]	3.01[14]	5.409	6.22[10]	1.05[08]	1211.61	1.05[08]	3.19[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	9.78[11]	9.78[11]	5.434	1.05[11]	1.31[08]	1212.04	1.29[08]	3.91[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> F <sub>7/2</sub>	3.04[14]	3.04[14]	5.411	8.42[10]	1.69[08]	1214.86	1.68[08]	5.13[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p7s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.64[13]	3.64[13]	5.389	1.09[10]	4.07[08]	1217.41	4.07[08]	1.24[-15]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> P <sub>1/2</sub>	2s2p7s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	4.50[11]	4.50[11]	5.267	3.38[09]	1.04[08]	1218.15	1.04[08]	3.21[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p7s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	3.50[13]	3.50[13]	5.352	5.29[09]	2.27[08]	1218.50	2.27[08]	6.95[-16]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_{S}^{\text{eff}}$
Conf.	LSJ	Conf.	LSJ	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	$\text{\AA}$	$s^{-1}$	$\text{cm}^3/s$
2s2p4p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p7s	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	4.50[11]	4.50[11]	5.267	3.38[09]	1.05[08]	1221.34	1.05[08]	3.25[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> F <sub>7/2</sub>	3.38[13]	3.38[13]	0.413	4.30[10]	4.67[09]	1227.32	4.67[09]	2.35[-14]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> F <sub>5/2</sub>	3.38[13]	3.38[13]	0.405	3.24[10]	3.26[09]	1227.89	3.26[09]	1.64[-14]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> F <sub>5/2</sub>	3.38[13]	3.38[13]	0.405	3.24[10]	2.42[08]	1228.24	2.42[08]	1.22[-15]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	5.68[10]	5.68[10]	5.891	9.46[09]	1.97[08]	1240.70	1.81[08]	5.27[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	4.83[10]	4.83[10]	5.877	1.90[10]	3.72[08]	1242.48	3.39[08]	9.85[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	8.20[13]	8.20[13]	5.692	6.86[10]	1.82[08]	1265.98	1.82[08]	5.40[-16]
2s2p3p	( <sup>1</sup> P) <sup>2</sup> F <sub>3/2</sub>	2s2p5s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	5.58[13]	5.58[13]	0.218	9.29[09]	1.90[08]	1277.61	1.90[08]	9.73[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	4.32[09]	4.32[09]	5.862	3.34[09]	1.58[08]	1292.88	1.44[08]	4.19[-16]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	4.23[09]	4.23[09]	5.857	3.33[09]	3.27[08]	1293.77	2.98[08]	8.68[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p6s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2.19[13]	2.19[13]	3.570	1.33[10]	3.73[08]	1294.92	3.72[08]	1.36[-15]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	4.23[09]	4.23[09]	5.857	3.33[09]	1.39[08]	1294.96	1.27[08]	3.70[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p6s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2.02[13]	2.02[13]	3.536	6.77[09]	1.54[08]	1296.19	1.54[08]	5.67[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> G <sub>5/2</sub>	9.73[09]	9.73[09]	5.817	2.53[09]	8.24[08]	1298.30	7.89[08]	2.31[-15]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	3.49[08]	3.49[08]	5.817	3.31[09]	8.92[08]	1298.49	4.08[08]	1.19[-15]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	3.49[08]	3.49[08]	5.817	3.31[09]	2.89[08]	1299.22	1.32[08]	3.87[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> G <sub>11/2</sub>	2.55[08]	2.55[08]	5.821	5.00[09]	1.45[09]	1299.50	5.49[08]	1.61[-15]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	1.59[08]	1.59[08]	5.821	4.16[09]	1.15[09]	1299.93	3.17[08]	9.26[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	4.23[09]	4.23[09]	5.803	3.33[09]	1.88[08]	1300.35	1.71[08]	5.00[-16]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	4.23[09]	4.23[09]	5.803	3.33[09]	6.40[08]	1301.08	5.83[08]	1.71[-15]
2p <sup>2</sup> 3s	( <sup>1</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	6.17[12]	6.17[12]	6.920	4.74[10]	5.61[08]	1302.81	5.61[08]	1.47[-15]
2p <sup>2</sup> 3s	( <sup>1</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p8d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	5.46[12]	5.46[12]	6.896	3.26[10]	3.16[08]	1305.67	3.16[08]	8.29[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p7s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.64[13]	3.64[13]	5.389	1.09[10]	1.04[08]	1306.32	1.04[08]	3.17[-16]
2p <sup>2</sup> 3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	4.83[10]	4.83[10]	5.877	1.90[10]	1.36[08]	1309.26	1.24[08]	3.61[-16]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2.01[09]	2.01[09]	4.087	4.72[10]	4.14[08]	1313.05	1.05[08]	3.66[-16]
2p <sup>2</sup> 3s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	5.20[09]	5.20[09]	5.802	2.29[10]	4.21[08]	1315.90	2.00[08]	5.86[-16]
2p <sup>2</sup> 3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	3.28[12]	3.28[12]	5.812	3.52[10]	6.38[08]	1318.27	6.36[08]	1.86[-15]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2.95[09]	2.95[09]	4.004	6.26[09]	8.22[08]	1318.96	6.08[08]	2.13[-15]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	4.96[09]	4.96[09]	4.018	8.77[09]	1.22[09]	1319.25	1.00[09]	3.51[-15]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2.95[09]	2.95[09]	4.004	6.26[09]	1.61[08]	1321.27	1.19[08]	4.17[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	4.32[09]	4.32[09]	5.862	3.34[09]	1.32[08]	1325.47	1.20[08]	3.51[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	5.73[12]	5.73[12]	5.862	1.16[10]	1.08[08]	1327.04	1.08[08]	3.14[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	4.32[09]	4.32[09]	5.862	3.34[09]	4.26[08]	1327.09	3.89[08]	1.13[-15]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	4.23[09]	4.23[09]	5.857	3.33[09]	1.36[08]	1327.72	1.24[08]	3.61[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	1.28[12]	1.28[12]	5.867	4.35[09]	1.76[08]	1327.89	1.76[08]	5.13[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> G <sub>5/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	4.23[09]	4.23[09]	5.857	3.33[09]	2.87[08]	1328.20	2.61[08]	7.61[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	5.73[12]	5.73[12]	5.862	1.16[10]	4.04[08]	1328.54	4.04[08]	1.18[-15]
2p <sup>2</sup> 3s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	8.34[13]	8.34[13]	5.691	3.45[10]	1.17[08]	1331.68	1.17[08]	3.45[-16]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	4.32[09]	4.32[09]	5.862	3.34[09]	5.03[08]	1331.70	4.59[08]	1.34[-15]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> H <sub>7/2</sub>	3.84[09]	3.84[09]	5.828	3.35[09]	4.75[08]	1331.82	4.28[08]	1.25[-15]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> G <sub>5/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> H <sub>7/2</sub>	3.84[09]	3.84[09]	5.828	3.35[09]	5.46[08]	1332.30	4.92[08]	1.44[-15]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	4.23[09]	4.23[09]	5.857	3.33[09]	3.02[08]	1332.34	2.75[08]	8.01[-16]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	1.28[12]	1.28[12]	5.867	4.35[09]	6.06[08]	1333.61	6.05[08]	1.76[-15]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p7d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	1.83[13]	1.83[13]	5.861	3.30[10]	1.46[08]	1334.47	1.46[08]	4.26[-16]
2p <sup>2</sup> 3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p4d	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	8.20[13]	8.20[13]	5.692	6.86[10]	2.97[08]	1335.37	2.96[08]	8.78[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> G <sub>5/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	4.23[09]	4.23[09]	5.803	3.33[09]	4.16[08]	1335.91	3.79[08]	1.11[-15]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> H <sub>7/2</sub>	3.84[09]	3.84[09]	5.828	3.35[09]	2.23[08]	1336.46	2.01[08]	5.89[-16]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> S <sub>3/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	7.25[09]	7.25[09]	4.108	2.20[10]	2.72[08]	1336.73	1.81[08]	6.28[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> G <sub>9/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> G <sub>11/2</sub>	2.55[08]	2.55[08]	5.821	5.00[09]	6.49[08]	1336.75	2.46[08]	7.20[-16]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	4.23[09]	4.23[09]	5.803	3.33[09]	1.34[08]	1340.10	1.22[08]	3.56[-16]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> G <sub>7/2</sub>	2s2p7g	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	1.59[08]	1.59[08]	5.821	4.16[09]	3.76[08]	1340.55	1.04[08]	3.04[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>2</sup> F <sub>3/2</sub>	5.45[11]	5.45[11]	4.222	3.30[10]	6.57[08]	1370.71	6.50[08]	2.23[-15]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	5.36[11]	5.36[11]	4.249	4.38[10]	9.85[08]	1370.83	9.75[08]	3.34[-15]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_{S}^{CH}$
Conf.	$LSJ$	Conf.	$LSJ$	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	$\text{\AA}$	$s^{-1}$	$cm^3/s$
$2p^23s$	$(^3P)^2P_{3/2}$	$2s2p4d$	$(^1P)^2D_{5/2}$	9.78[11]	9.78[11]	5.434	1.05[11]	4.24[08]	1373.45	4.17[08]	1.27[-15]
$2s2p4p$	$(^3P)^4P_{5/2}$	$2s2p6d$	$(^3P)^4P_{5/2}$	7.25[09]	7.25[09]	4.108	2.20[10]	2.87[08]	1378.75	1.90[08]	6.61[-16]
$2s2p4p$	$(^3P)^4P_{5/2}$	$2s2p6d$	$(^3P)^2D_{5/2}$	4.02[09]	4.02[09]	4.098	2.43[10]	3.24[08]	1380.27	1.61[08]	5.60[-16]
$2s2p4p$	$(^3P)^4P_{5/2}$	$2s2p6d$	$(^3P)^4D_{7/2}$	2.01[09]	2.01[09]	4.087	4.72[10]	1.19[09]	1382.11	3.02[08]	1.05[-15]
$2s2p4p$	$(^3P)^4P_{3/2}$	$2s2p6d$	$(^3P)^4D_{5/2}$	1.12[09]	1.12[09]	4.062	2.96[10]	6.16[08]	1383.63	1.14[08]	3.97[-16]
$2s2p4p$	$(^3P)^4D_{3/2}$	$2s2p6s$	$(^3P)^4P_{3/2}$	1.01[10]	1.01[10]	3.308	5.34[09]	1.58[08]	1424.35	1.39[08]	5.23[-16]
$2s2p4p$	$(^3P)^4D_{5/2}$	$2s2p6s$	$(^3P)^4P_{3/2}$	1.01[10]	1.01[10]	3.308	5.34[09]	3.36[08]	1427.04	2.96[08]	1.11[-15]
$2s^28d$	$(^1S)^2D_{5/2}$	$2s2p4d$	$(^1P)^2F_{7/2}$	3.04[14]	3.04[14]	5.411	8.42[10]	1.66[08]	1427.74	1.66[08]	5.06[-16]
$2s^28d$	$(^1S)^2D_{3/2}$	$2s2p4d$	$(^1P)^2F_{5/2}$	3.01[14]	3.01[14]	5.409	6.22[10]	1.15[08]	1427.95	1.15[08]	3.50[-16]
$2p^23s$	$(^1D)^2D_{5/2}$	$2s2p7d$	$(^3P)^2F_{7/2}$	2.61[13]	2.61[13]	5.885	5.93[10]	2.18[08]	1461.80	2.18[08]	6.33[-16]
$2s2p4p$	$(^3P)^2S_{1/2}$	$2s2p6d$	$(^3P)^2P_{1/2}$	4.07[10]	4.07[10]	4.295	1.10[10]	2.18[08]	1476.48	1.92[08]	6.54[-16]
$2s2p4p$	$(^3P)^2S_{1/2}$	$2s2p6d$	$(^3P)^2P_{3/2}$	3.63[10]	3.63[10]	4.278	2.19[10]	4.40[08]	1479.46	3.82[08]	1.30[-15]
$2s2p4p$	$(^3P)^2D_{5/2}$	$2s2p6s$	$(^3P)^2P_{3/2}$	2.19[13]	2.19[13]	3.570	1.33[10]	5.60[08]	1482.17	5.60[08]	2.05[-15]
$2s2p4p$	$(^3P)^2D_{3/2}$	$2s2p6s$	$(^3P)^2P_{1/2}$	2.02[13]	2.02[13]	3.536	6.77[09]	3.05[08]	1483.05	3.05[08]	1.12[-15]
$2s2p4p$	$(^3P)^4P_{1/2}$	$2s2p6s$	$(^3P)^4P_{3/2}$	1.01[10]	1.01[10]	3.308	5.34[09]	1.80[08]	1508.47	1.59[08]	5.98[-16]
$2s2p4p$	$(^3P)^4P_{5/2}$	$2s2p6s$	$(^3P)^4P_{3/2}$	1.01[10]	1.01[10]	3.308	5.34[09]	1.79[08]	1513.37	1.58[08]	5.93[-16]
$2s2p4p$	$(^3P)^4P_{3/2}$	$2s2p6s$	$(^3P)^4P_{1/2}$	2.85[09]	2.85[09]	3.290	2.64[09]	1.59[08]	1514.00	1.08[08]	4.08[-16]
$2s2p4f$	$(^3P)^4F_{7/2}$	$2s2p6g$	$(^3P)^4F_{7/2}$	7.78[09]	7.78[09]	4.254	5.62[09]	3.01[08]	1553.31	2.76[08]	9.43[-16]
$2s2p4f$	$(^3P)^4F_{5/2}$	$2s2p6g$	$(^3P)^2F_{7/2}$	1.72[09]	1.72[09]	4.247	5.55[09]	1.51[08]	1554.08	1.07[08]	3.67[-16]
$2s2p4f$	$(^3P)^2F_{5/2}$	$2s2p6g$	$(^3P)^2F_{7/2}$	1.72[09]	1.72[09]	4.247	5.55[09]	5.23[08]	1555.13	3.72[08]	1.27[-15]
$2s2p4f$	$(^3P)^2F_{7/2}$	$2s2p6g$	$(^3P)^2F_{7/2}$	1.72[09]	1.72[09]	4.247	5.55[09]	3.00[08]	1556.85	2.13[08]	7.31[-16]
$2s2p4f$	$(^3P)^4F_{3/2}$	$2s2p6g$	$(^3P)^4G_{5/2}$	1.36[08]	1.36[08]	4.203	3.98[09]	1.83[09]	1562.35	3.12[08]	1.07[-15]
$2s2p4f$	$(^3P)^4F_{5/2}$	$2s2p6g$	$(^3P)^4G_{11/2}$	3.21[08]	3.21[08]	4.208	7.96[09]	3.48[09]	1563.88	1.14[09]	3.90[-15]
$2s2p4f$	$(^3P)^2F_{7/2}$	$2s2p6g$	$(^3P)^2G_{9/2}$	2.14[08]	2.14[08]	4.208	6.63[09]	2.76[09]	1564.50	6.74[08]	2.32[-15]
$2s2p4f$	$(^3P)^4F_{5/2}$	$2s2p6g$	$(^3P)^4G_{7/2}$	2.79[08]	2.79[08]	4.192	5.29[09]	4.48[08]	1564.83	1.33[08]	4.58[-16]
$2s2p4f$	$(^3P)^2F_{5/2}$	$2s2p6g$	$(^3P)^4G_{7/2}$	2.79[08]	2.79[08]	4.192	5.29[09]	1.53[09]	1565.89	4.54[08]	1.56[-15]
$2p^23s$	$(^3P)^2P_{3/2}$	$2s2p6d$	$(^3P)^2P_{3/2}$	3.63[10]	3.63[10]	4.278	2.19[10]	1.30[08]	1575.13	1.13[08]	3.84[-16]
$2s2p4p$	$(^3P)^2P_{1/2}$	$2p^23p$	$(^1D)^2P_{1/2}$	2.98[13]	2.98[13]	1.790	1.67[10]	1.29[08]	1585.65	1.29[08]	5.63[-16]
$2s2p4p$	$(^3P)^2P_{3/2}$	$2p^23p$	$(^1D)^2P_{3/2}$	3.04[13]	3.04[13]	1.803	3.31[10]	3.23[08]	1587.90	3.23[08]	1.41[-15]
$2s2p4f$	$(^3P)^4D_{7/2}$	$2s2p6g$	$(^3P)^4F_{7/2}$	7.78[09]	7.78[09]	4.254	5.62[09]	2.90[08]	1600.59	2.66[08]	9.10[-16]
$2s2p4f$	$(^3P)^4D_{5/2}$	$2s2p6g$	$(^3P)^2F_{5/2}$	1.94[09]	1.94[09]	4.260	3.92[09]	1.49[08]	1601.63	1.12[08]	3.82[-16]
$2s2p4f$	$(^3P)^4D_{5/2}$	$2s2p6g$	$(^3P)^4F_{7/2}$	7.78[09]	7.78[09]	4.254	5.62[09]	9.40[08]	1602.96	8.62[08]	2.95[-15]
$2s2p4f$	$(^3P)^4D_{5/2}$	$2s2p6g$	$(^3P)^4F_{5/2}$	1.13[09]	1.13[09]	4.254	3.93[09]	2.60[08]	1602.96	1.65[08]	5.64[-16]
$2s2p4f$	$(^3P)^4D_{3/2}$	$2s2p6g$	$(^3P)^2F_{5/2}$	1.94[09]	1.94[09]	4.260	3.92[09]	4.14[08]	1603.82	3.10[08]	1.06[-15]
$2s2p4f$	$(^3P)^4D_{5/2}$	$2s2p6g$	$(^3P)^2F_{7/2}$	1.72[09]	1.72[09]	4.247	5.55[09]	3.53[08]	1604.44	2.52[08]	8.61[-16]
$2s2p4f$	$(^3P)^4G_{5/2}$	$2s2p6g$	$(^3P)^2F_{7/2}$	1.72[09]	1.72[09]	4.247	5.55[09]	6.20[08]	1605.14	4.41[08]	1.51[-15]
$2s2p4f$	$(^3P)^4D_{3/2}$	$2s2p6g$	$(^3P)^4F_{5/2}$	1.13[09]	1.13[09]	4.254	3.93[09]	9.96[08]	1605.15	6.31[08]	2.16[-15]
$2s2p4f$	$(^3P)^2D_{5/2}$	$2s2p6g$	$(^3P)^2F_{5/2}$	1.94[09]	1.94[09]	4.260	3.92[09]	1.59[08]	1608.35	1.19[08]	4.07[-16]
$2s2p4f$	$(^3P)^4G_{9/2}$	$2s2p6g$	$(^3P)^4H_{11/2}$	6.20[07]	6.20[07]	4.249	7.93[09]	2.76[09]	1609.51	2.37[08]	8.10[-16]
$2s2p4f$	$(^3P)^4D_{5/2}$	$2s2p6g$	$(^3P)^4H_{7/2}$	3.28[08]	3.28[08]	4.221	5.26[09]	9.37[08]	1609.69	3.12[08]	1.07[-15]
$2s2p4f$	$(^3P)^2D_{5/2}$	$2s2p6g$	$(^3P)^4F_{7/2}$	7.78[09]	7.78[09]	4.254	5.62[09]	1.11[09]	1609.70	1.02[09]	3.49[-15]
$2s2p4f$	$(^3P)^4G_{5/2}$	$2s2p6g$	$(^3P)^4H_{7/2}$	3.28[08]	3.28[08]	4.221	5.26[09]	1.27[09]	1610.39	4.22[08]	1.45[-15]
$2s2p4f$	$(^3P)^2D_{5/2}$	$2s2p6g$	$(^3P)^2F_{7/2}$	1.72[09]	1.72[09]	4.247	5.55[09]	7.68[08]	1611.19	5.47[08]	1.87[-15]
$2s2p4f$	$(^3P)^2D_{3/2}$	$2s2p6g$	$(^3P)^2F_{5/2}$	1.94[09]	1.94[09]	4.260	3.92[09]	1.32[09]	1612.17	9.86[08]	3.37[-15]
$2s2p4f$	$(^3P)^2D_{3/2}$	$2s2p6g$	$(^3P)^4F_{5/2}$	1.13[09]	1.13[09]	4.254	3.93[09]	4.85[08]	1613.52	3.08[08]	1.05[-15]
$2s2p4f$	$(^3P)^2D_{5/2}$	$2s2p6g$	$(^3P)^4H_{7/2}$	3.28[08]	3.28[08]	4.221	5.26[09]	4.01[08]	1616.48	1.34[08]	4.58[-16]
$2s2p4f$	$(^3P)^4G_{5/2}$	$2s2p6g$	$(^3P)^4G_{7/2}$	2.79[08]	2.79[08]	4.192	5.29[09]	7.14[08]	1616.61	2.12[08]	7.29[-16]
$2s2p4f$	$(^3P)^4G_{9/2}$	$2s2p6g$	$(^3P)^4G_{11/2}$	3.21[08]	3.21[08]	4.208	7.96[09]	1.02[09]	1618.14	3.32[08]	1.14[-15]
$2s2p4f$	$(^3P)^2G_{9/2}$	$2s2p6g$	$(^3P)^2H_{11/2}$	2.29[07]	2.29[07]	4.260	7.85[09]	3.90[09]	1618.38	1.32[08]	4.51[-16]
$2s2p4f$	$(^3P)^2G_{7/2}$	$2s2p6g$	$(^3P)^2G_{9/2}$	2.14[08]	2.14[08]	4.208	6.63[09]	5.90[08]	1623.71	1.44[08]	4.95[-16]
$2s2p4p$	$(^3P)^2P_{1/2}$	$2p^23p$	$(^1D)^2D_{3/2}$	6.73[10]	6.73[10]	1.558	1.70[10]	1.76[08]	1634.18	1.66[08]	7.43[-16]
$2s2p4p$	$(^3P)^2P_{3/2}$	$2p^23p$	$(^1D)^2D_{5/2}$	2.80[12]	2.80[12]	1.553	3.41[10]	2.20[08]	1640.42	2.19[08]	9.83[-16]
$2s2p4p$	$(^3P)^2P_{3/2}$	$2s2p5d$	$(^3P)^2D_{5/2}$	2.13[10]	2.13[10]	1.299	6.23[10]	6.66[08]	1697.63	4.48[08]	2.06[-15]

Low level		Upper level		A <sub>a</sub>	ΣA <sub>a</sub>	E <sub>S</sub>	ΣgA <sub>r</sub>	gA <sub>r</sub>	λ	Q <sub>d</sub>	C <sub>S</sub> <sup>eff</sup>
Conf.	LSJ	Conf.	LSJ	s <sup>-1</sup>	s <sup>-1</sup>	eV	s <sup>-1</sup>	s <sup>-1</sup>	Å	s <sup>-1</sup>	cm <sup>3</sup> /s
2p <sup>2</sup> 3s	( <sup>1</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	5.36[11]	5.36[11]	4.249	4.38[10]	3.21[08]	1811.00	3.17[08]	1.09[-15]
2p <sup>2</sup> 3s	( <sup>1</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p6d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	5.45[11]	5.45[11]	4.222	3.30[10]	2.14[08]	1817.48	2.12[08]	7.28[-16]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	8.99[09]	8.99[09]	1.294	8.35[10]	4.94[08]	1864.43	2.29[08]	1.05[-15]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> P <sub>1/2</sub>	2.98[13]	2.98[13]	1.790	1.67[10]	1.55[08]	1874.59	1.55[08]	6.78[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> P <sub>3/2</sub>	3.04[13]	3.04[13]	1.803	3.31[10]	2.79[08]	1879.00	2.78[08]	1.22[-15]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> D <sub>3/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	9.97[09]	9.97[09]	1.171	8.53[09]	1.21[09]	1888.06	1.06[09]	4.92[-15]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.60[10]	1.60[10]	1.185	1.15[10]	1.82[09]	1888.57	1.67[09]	7.77[-15]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	9.97[09]	9.97[09]	1.171	8.53[09]	3.00[08]	1892.80	2.62[08]	1.22[-15]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	1.60[10]	1.60[10]	1.185	1.15[10]	1.96[08]	1895.44	1.80[08]	8.36[-16]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> S <sub>3/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	3.86[09]	3.86[09]	1.328	4.41[10]	6.34[08]	1908.84	2.18[08]	1.00[-15]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	6.71[12]	6.71[12]	1.570	4.32[10]	5.52[08]	1939.30	5.51[08]	2.47[-15]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	8.87[12]	8.87[12]	1.594	6.69[10]	1.07[09]	1940.61	1.07[09]	4.78[-15]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> D <sub>5/2</sub>	2.80[12]	2.80[12]	1.553	3.41[10]	1.94[08]	1944.24	1.93[08]	8.66[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> D <sub>5/2</sub>	2.80[12]	2.80[12]	1.553	3.41[10]	1.00[08]	1952.99	1.00[08]	4.48[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	5.58[13]	5.58[13]	0.218	9.29[09]	2.86[08]	1992.37	2.86[08]	1.47[-15]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2s2p5s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	5.56[13]	5.56[13]	0.185	4.71[09]	1.21[08]	1995.35	1.21[08]	6.22[-16]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	3.86[09]	3.86[09]	1.328	4.41[10]	7.06[08]	1995.69	2.43[08]	1.11[-15]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> P <sub>5/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	8.99[09]	8.99[09]	1.294	8.35[10]	1.75[09]	2006.80	8.08[08]	3.72[-15]
2s2p4p	( <sup>3</sup> P) <sup>4</sup> P <sub>3/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	8.16[09]	8.16[09]	1.275	5.81[10]	9.25[08]	2008.30	4.23[08]	1.95[-15]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2.13[10]	2.13[10]	1.299	6.23[10]	4.58[08]	2034.62	3.08[08]	1.41[-15]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	1.15[10]	1.15[10]	1.632	1.69[10]	2.76[08]	2162.36	1.59[08]	7.07[-16]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> S <sub>1/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	9.17[09]	9.17[09]	1.615	3.33[10]	5.48[08]	2168.86	2.87[08]	1.28[-15]
2p <sup>2</sup> 3s	( <sup>1</sup> D) <sup>2</sup> D <sub>5/2</sub>	2s2p4s	( <sup>1</sup> P) <sup>2</sup> P <sub>3/2</sub>	3.90[13]	3.90[13]	3.089	1.96[10]	2.50[08]	2180.75	2.50[08]	9.60[-16]
2p <sup>2</sup> 3s	( <sup>1</sup> D) <sup>2</sup> D <sub>3/2</sub>	2s2p4s	( <sup>1</sup> P) <sup>2</sup> P <sub>1/2</sub>	4.13[13]	4.13[13]	3.078	9.66[09]	1.36[08]	2183.38	1.35[08]	5.21[-16]
2p <sup>2</sup> 3s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> P <sub>1/2</sub>	2.98[13]	2.98[13]	1.790	1.67[10]	1.51[08]	2291.76	1.51[08]	6.61[-16]
2p <sup>2</sup> 3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> P <sub>3/2</sub>	3.04[13]	3.04[13]	1.803	3.31[10]	3.84[08]	2297.57	3.83[08]	1.68[-15]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p5g	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2.29[10]	2.29[10]	1.601	6.71[09]	2.60[08]	2325.33	2.48[08]	1.10[-15]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p5g	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2.29[10]	2.29[10]	1.601	6.71[09]	1.26[08]	2327.68	1.20[08]	5.36[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> F <sub>3/2</sub>	2s2p5g	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	1.71[10]	1.71[10]	1.592	6.72[09]	1.21[08]	2328.50	1.13[08]	5.06[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p5g	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	1.71[10]	1.71[10]	1.592	6.72[09]	2.07[08]	2329.12	1.94[08]	8.67[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p5g	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	7.53[11]	7.53[11]	1.592	1.42[10]	6.99[08]	2330.61	6.97[08]	3.11[-15]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p5g	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	1.71[10]	1.71[10]	1.592	6.72[09]	3.94[08]	2331.48	3.69[08]	1.65[-15]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p5g	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	7.53[11]	7.53[11]	1.592	1.42[10]	1.13[08]	2331.57	1.13[08]	5.05[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p5g	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	9.29[09]	9.29[09]	1.580	9.09[09]	2.08[08]	2334.16	1.85[08]	8.29[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	2s2p5g	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	9.29[09]	9.29[09]	1.580	9.09[09]	1.30[08]	2335.56	1.16[08]	5.19[-16]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p5g	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	9.29[09]	9.29[09]	1.580	9.09[09]	7.38[08]	2336.52	6.57[08]	2.94[-15]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	2s2p5g	( <sup>3</sup> P) <sup>4</sup> H <sub>11/2</sub>	1.16[08]	1.16[08]	1.582	1.35[10]	1.54[09]	2338.19	1.44[08]	6.45[-16]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p5g	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	9.29[09]	9.29[09]	1.580	9.09[09]	8.81[08]	2340.42	7.85[08]	3.51[-15]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> F <sub>9/2</sub>	2s2p5g	( <sup>3</sup> P) <sup>4</sup> G <sub>11/2</sub>	3.10[08]	3.10[08]	1.532	1.37[10]	1.14[10]	2360.37	2.43[09]	1.09[-14]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	2s2p5g	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	2.78[08]	2.78[08]	1.519	9.08[09]	1.51[09]	2361.35	2.96[08]	1.33[-15]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	2s2p5g	( <sup>3</sup> P) <sup>2</sup> G <sub>9/2</sub>	2.26[08]	2.26[08]	1.532	1.14[10]	9.02[09]	2361.81	1.49[09]	6.69[-15]
2s2p4f	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2s2p5g	( <sup>3</sup> P) <sup>4</sup> G <sub>7/2</sub>	2.78[08]	2.78[08]	1.519	9.08[09]	5.12[09]	2363.78	1.01[09]	4.52[-15]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>3/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> F <sub>5/2</sub>	3.38[13]	3.38[13]	0.405	3.24[10]	5.03[08]	2371.05	5.03[08]	2.53[-15]
2s2p4p	( <sup>3</sup> P) <sup>2</sup> D <sub>5/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> F <sub>7/2</sub>	3.38[13]	3.38[13]	0.413	4.30[10]	7.09[08]	2380.58	7.09[08]	3.56[-15]
2p <sup>2</sup> 3s	( <sup>3</sup> P) <sup>2</sup> P <sub>1/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> D <sub>3/2</sub>	6.73[10]	6.73[10]	1.558	1.70[10]	5.54[08]	2394.52	5.21[08]	2.34[-15]
2p <sup>2</sup> 3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	6.71[12]	6.71[12]	1.570	4.32[10]	2.98[08]	2401.60	2.98[08]	1.33[-15]
2p <sup>2</sup> 3s	( <sup>3</sup> P) <sup>2</sup> P <sub>3/2</sub>	2p <sup>2</sup> 3p	( <sup>1</sup> D) <sup>2</sup> D <sub>5/2</sub>	2.80[12]	2.80[12]	1.553	3.41[10]	6.61[08]	2409.18	6.60[08]	2.96[-15]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p5g	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	7.53[11]	7.53[11]	1.592	1.42[10]	8.59[08]	2438.69	8.57[08]	3.83[-15]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p5g	( <sup>3</sup> P) <sup>2</sup> F <sub>5/2</sub>	2.29[10]	2.29[10]	1.601	6.71[09]	4.35[08]	2439.93	4.15[08]	1.85[-15]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p5d	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	8.87[12]	8.87[12]	1.594	6.69[10]	2.00[08]	2443.12	2.00[08]	8.92[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p5g	( <sup>3</sup> P) <sup>4</sup> F <sub>5/2</sub>	1.71[10]	1.71[10]	1.592	6.72[09]	8.31[08]	2444.10	7.80[08]	3.48[-15]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> D <sub>7/2</sub>	2s2p5g	( <sup>3</sup> P) <sup>2</sup> F <sub>7/2</sub>	9.29[09]	9.29[09]	1.580	9.09[09]	1.91[08]	2444.11	1.70[08]	7.60[-16]
2s2p4f	( <sup>3</sup> P) <sup>4</sup> D <sub>5/2</sub>	2s2p5g	( <sup>3</sup> P) <sup>4</sup> F <sub>7/2</sub>	7.53[11]	7.53[11]	1.592	1.42[10]	2.77[09]	2444.20	2.76[09]	1.23[-14]

Low level		Upper level		$A_a$	$\Sigma A_a$	$E_S$	$\Sigma gA_r$	$gA_r$	$\lambda$	$Q_d$	$C_S^{\text{eff}}$
Conf.	$LSJ$	Conf.	$LSJ$	$s^{-1}$	$s^{-1}$	eV	$s^{-1}$	$s^{-1}$	$\text{\AA}$	$s^{-1}$	$\text{cm}^3/s$
2s2p4f	$(^3P)^4D_{3/2}$	2s2p5g	$(^3P)^2F_{5/2}$	2.29[10]	2.29[10]	1.601	6.71[09]	1.22[09]	2445.01	1.17[09]	5.20[-15]
2s2p4f	$(^3P)^4G_{5/2}$	2s2p5g	$(^3P)^4F_{5/2}$	1.71[10]	1.71[10]	1.592	6.72[09]	2.16[08]	2445.72	2.03[08]	9.06[-16]
2s2p4f	$(^3P)^4G_{5/2}$	2s2p5g	$(^3P)^4F_{7/2}$	7.53[11]	7.53[11]	1.592	1.42[10]	2.55[08]	2445.83	2.55[08]	1.14[-15]
2s2p4f	$(^3P)^4D_{3/2}$	2s2p5g	$(^3P)^4F_{5/2}$	1.71[10]	1.71[10]	1.592	6.72[09]	3.11[09]	2449.20	2.92[09]	1.30[-14]
2s2p4f	$(^3P)^4D_{5/2}$	2s2p5g	$(^3P)^2F_{7/2}$	9.29[09]	9.29[09]	1.580	9.09[09]	1.60[09]	2449.65	1.42[09]	6.37[-15]
2s2p4f	$(^3P)^4G_{5/2}$	2s2p5g	$(^3P)^2F_{7/2}$	9.29[09]	9.29[09]	1.580	9.09[09]	1.63[09]	2451.28	1.45[09]	6.49[-15]
2s2p4f	$(^3P)^4G_{7/2}$	2s2p5g	$(^3P)^2F_{7/2}$	9.29[09]	9.29[09]	1.580	9.09[09]	2.73[08]	2455.53	2.43[08]	1.09[-15]
2s2p4f	$(^3P)^2D_{5/2}$	2s2p5g	$(^3P)^2F_{5/2}$	2.29[10]	2.29[10]	1.601	6.71[09]	4.70[08]	2455.57	4.49[08]	2.00[-15]
2s2p4f	$(^3P)^2D_{5/2}$	2s2p5d	$(^3P)^2F_{7/2}$	8.87[12]	8.87[12]	1.594	6.69[10]	3.28[08]	2458.80	3.27[08]	1.46[-15]
2s2p4f	$(^3P)^2D_{5/2}$	2s2p5g	$(^3P)^4F_{7/2}$	7.53[11]	7.53[11]	1.592	1.42[10]	3.22[09]	2459.90	3.21[09]	1.43[-14]
2s2p4f	$(^3P)^4G_{9/2}$	2s2p5g	$(^3P)^4H_{11/2}$	1.16[08]	1.16[08]	1.582	1.35[10]	9.42[09]	2461.61	8.83[08]	3.94[-15]
2s2p4f	$(^3P)^2D_{3/2}$	2s2p5g	$(^3P)^2F_{5/2}$	2.29[10]	2.29[10]	1.601	6.71[09]	3.92[09]	2464.49	3.74[09]	1.67[-14]
2s2p4f	$(^3P)^2D_{5/2}$	2s2p5g	$(^3P)^2F_{7/2}$	9.29[09]	9.29[09]	1.580	9.09[09]	3.03[09]	2465.41	2.70[09]	1.21[-14]
2s2p4f	$(^3P)^2D_{3/2}$	2s2p5g	$(^3P)^4F_{5/2}$	1.71[10]	1.71[10]	1.592	6.72[09]	1.56[09]	2468.74	1.46[09]	6.53[-15]
2s2p4p	$(^3P)^2D_{5/2}$	2s2p5s	$(^3P)^2P_{3/2}$	5.58[13]	5.58[13]	0.218	9.29[09]	6.27[08]	2473.10	6.27[08]	3.21[-15]
2s2p4f	$(^3P)^2G_{7/2}$	2s2p5g	$(^3P)^4H_{9/2}$	2.42[07]	2.42[07]	1.582	1.12[10]	5.98[09]	2474.52	1.26[08]	5.64[-16]
2s2p4f	$(^3P)^2G_{7/2}$	2s2p5g	$(^3P)^2F_{7/2}$	9.29[09]	9.29[09]	1.580	9.09[09]	1.36[08]	2475.44	1.21[08]	5.43[-16]
2s2p4p	$(^3P)^2D_{3/2}$	2s2p5s	$(^3P)^2P_{1/2}$	5.56[13]	5.56[13]	0.185	4.71[09]	3.46[08]	2475.48	3.46[08]	1.78[-15]
2s2p4f	$(^3P)^2G_{9/2}$	2s2p5g	$(^3P)^2H_{11/2}$	2.38[07]	2.38[07]	1.597	1.34[10]	1.17[10]	2480.76	2.45[08]	1.09[-15]
2s2p4f	$(^3P)^4G_{5/2}$	2s2p5g	$(^3P)^4G_{7/2}$	2.78[08]	2.78[08]	1.519	9.08[09]	1.42[09]	2481.29	2.79[08]	1.25[-15]
2s2p4f	$(^3P)^4G_{9/2}$	2s2p5g	$(^3P)^4G_{11/2}$	3.10[08]	3.10[08]	1.532	1.37[10]	1.78[09]	2486.19	3.81[08]	1.71[-15]
2s2p4f	$(^3P)^2G_{9/2}$	2s2p5g	$(^3P)^4H_{11/2}$	1.16[08]	1.16[08]	1.582	1.35[10]	1.43[09]	2488.06	1.34[08]	5.99[-16]
2s2p4f	$(^3P)^2G_{7/2}$	2s2p5g	$(^3P)^2G_{9/2}$	2.26[08]	2.26[08]	1.532	1.14[10]	1.04[09]	2499.39	1.72[08]	7.73[-16]
2s2p4f	$(^3P)^4G_{9/2}$	2s2p5d	$(^3P)^4F_{7/2}$	1.60[10]	1.60[10]	1.185	1.15[10]	1.86[08]	2672.21	1.70[08]	7.91[-16]
2s2p4f	$(^3P)^4G_{7/2}$	2s2p5d	$(^3P)^4F_{5/2}$	9.97[09]	9.97[09]	1.171	8.53[09]	1.36[08]	2672.42	1.19[08]	5.55[-16]
2p <sup>2</sup> 3s	$(^1D)^2D_{5/2}$	2p <sup>2</sup> 3p	$(^1D)^2P_{3/2}$	3.04[13]	3.04[13]	1.803	3.31[10]	3.33[08]	2817.76	3.33[08]	1.45[-15]
2p <sup>2</sup> 3s	$(^1D)^2D_{3/2}$	2p <sup>2</sup> 3p	$(^1D)^2P_{1/2}$	2.98[13]	2.98[13]	1.790	1.67[10]	1.92[08]	2823.93	1.92[08]	8.41[-16]
2s2p4p	$(^3P)^2S_{1/2}$	2s2p5s	$(^3P)^2P_{3/2}$	5.58[13]	5.58[13]	0.218	9.29[09]	1.71[08]	2869.91	1.71[08]	8.77[-16]
2p <sup>2</sup> 3s	$(^1D)^2D_{5/2}$	2s2p5d	$(^3P)^2F_{7/2}$	8.87[12]	8.87[12]	1.594	6.69[10]	5.47[08]	2958.61	5.47[08]	2.44[-15]
2p <sup>2</sup> 3s	$(^1D)^2D_{3/2}$	2s2p5d	$(^3P)^2F_{5/2}$	6.71[12]	6.71[12]	1.570	4.32[10]	1.78[08]	2973.39	1.78[08]	7.95[-16]
2p <sup>2</sup> 3s	$(^1D)^2D_{5/2}$	2s2p5d	$(^3P)^2F_{5/2}$	6.71[12]	6.71[12]	1.570	4.32[10]	3.85[08]	2975.83	3.84[08]	1.72[-15]
2p <sup>2</sup> 3s	$(^1D)^2D_{3/2}$	2p <sup>2</sup> 3p	$(^1D)^2D_{3/2}$	6.73[10]	6.73[10]	1.558	1.70[10]	4.84[08]	2981.60	4.55[08]	2.04[-15]
2p <sup>2</sup> 3s	$(^1D)^2D_{3/2}$	2p <sup>2</sup> 3p	$(^1D)^2D_{5/2}$	2.80[12]	2.80[12]	1.553	3.41[10]	2.84[08]	2985.03	2.84[08]	1.27[-15]
2p <sup>2</sup> 3s	$(^1D)^2D_{5/2}$	2p <sup>2</sup> 3p	$(^1D)^2D_{5/2}$	2.80[12]	2.80[12]	1.553	3.41[10]	4.07[08]	2987.49	4.06[08]	1.82[-15]
2p <sup>2</sup> 3s	$(^3P)^2P_{3/2}$	2s2p5s	$(^3P)^2P_{3/2}$	5.58[13]	5.58[13]	0.218	9.29[09]	1.63[08]	3253.17	1.63[08]	8.33[-16]
2p <sup>2</sup> 3s	$(^1D)^2D_{5/2}$	2p <sup>2</sup> 3p	$(^1D)^2F_{7/2}$	3.38[13]	3.38[13]	0.413	4.30[10]	3.98[08]	4119.32	3.98[08]	2.00[-15]
2p <sup>2</sup> 3s	$(^1D)^2D_{3/2}$	2p <sup>2</sup> 3p	$(^1D)^2F_{5/2}$	3.38[13]	3.38[13]	0.405	3.24[10]	2.78[08]	4125.07	2.78[08]	1.40[-15]
2p <sup>2</sup> 3s	$(^1D)^2D_{5/2}$	2s2p5s	$(^3P)^2P_{3/2}$	5.58[13]	5.58[13]	0.218	9.29[09]	1.89[08]	4404.44	1.89[08]	9.68[-16]
2p <sup>2</sup> 3s	$(^1D)^2D_{3/2}$	2s2p5s	$(^3P)^2P_{1/2}$	5.56[13]	5.56[13]	0.185	4.71[09]	1.00[08]	4451.82	1.00[08]	5.14[-16]

Table X: DR rate coefficients ( $\alpha_d$  in  $\text{cm}^3/\text{s}$ ) for excited odd-parity states of B-like oxygen.

$T_e$ eV	$2s^2 2p$ ( $1S$ )		$2p^3$ ( $4S$ )	$2p^3$ ( $2D$ )		$2p^3$ ( $2P$ )		$2p^2 3p$ ( $3P$ )
	$2P_{1/2}$	$2P_{3/2}$	$4S_{3/2}$	$2D_{3/2}$	$2D_{5/2}$	$2P_{1/2}$	$2P_{3/2}$	$4S_{3/2}$
0.1000	6.49[-14]	1.12[-13]	9.97[-14]	5.43[-14]	6.37[-14]	9.75[-14]	1.97[-13]	1.10[-17]
0.1300	1.67[-13]	2.92[-13]	3.71[-13]	1.72[-13]	1.74[-13]	2.43[-13]	4.66[-13]	4.19[-17]
0.1690	3.49[-13]	6.27[-13]	9.45[-13]	4.15[-13]	3.83[-13]	4.83[-13]	8.75[-13]	1.09[-16]
0.2197	6.08[-13]	1.13[-12]	1.80[-12]	7.86[-13]	6.91[-13]	8.08[-13]	1.38[-12]	2.14[-16]
0.2856	8.99[-13]	1.74[-12]	2.73[-12]	1.21[-12]	1.06[-12]	1.17[-12]	1.92[-12]	3.38[-16]
0.3713	1.14[-12]	2.28[-12]	3.49[-12]	1.60[-12]	1.41[-12]	1.50[-12]	2.41[-12]	4.50[-16]
0.4827	1.28[-12]	2.62[-12]	3.90[-12]	1.89[-12]	1.75[-12]	1.76[-12]	2.81[-12]	5.25[-16]
0.6275	1.30[-12]	2.70[-12]	3.91[-12]	2.11[-12]	2.12[-12]	1.94[-12]	3.15[-12]	5.48[-16]
0.8157	1.23[-12]	2.58[-12]	3.60[-12]	2.31[-12]	2.61[-12]	2.08[-12]	3.46[-12]	5.26[-16]
1.0604	1.12[-12]	2.35[-12]	3.10[-12]	2.52[-12]	3.18[-12]	2.18[-12]	3.72[-12]	4.75[-16]
1.3786	9.93[-13]	2.08[-12]	2.53[-12]	2.69[-12]	3.69[-12]	2.22[-12]	3.88[-12]	4.20[-16]
1.7922	8.68[-13]	1.80[-12]	1.98[-12]	2.74[-12]	3.99[-12]	2.17[-12]	3.87[-12]	3.92[-16]
2.3298	7.47[-13]	1.53[-12]	1.51[-12]	2.64[-12]	3.99[-12]	2.03[-12]	3.67[-12]	4.08[-16]
3.0287	6.30[-13]	1.28[-12]	1.11[-12]	2.39[-12]	3.69[-12]	1.82[-12]	3.32[-12]	4.60[-16]
3.9374	5.17[-13]	1.04[-12]	8.06[-13]	2.05[-12]	3.21[-12]	1.56[-12]	2.86[-12]	5.17[-16]
5.1186	4.14[-13]	8.27[-13]	5.75[-13]	1.68[-12]	2.65[-12]	1.28[-12]	2.38[-12]	5.46[-16]
6.6542	3.22[-13]	6.41[-13]	4.06[-13]	1.32[-12]	2.09[-12]	1.02[-12]	1.90[-12]	5.35[-16]
8.6504	2.45[-13]	4.86[-13]	2.83[-13]	1.00[-12]	1.59[-12]	7.91[-13]	1.48[-12]	4.87[-16]
11.2455	1.83[-13]	3.61[-13]	1.97[-13]	7.42[-13]	1.18[-12]	5.96[-13]	1.11[-12]	4.16[-16]
14.6192	1.34[-13]	2.64[-13]	1.35[-13]	5.38[-13]	8.59[-13]	4.39[-13]	8.23[-13]	3.38[-16]
19.0049	9.61[-14]	1.89[-13]	9.30[-14]	3.84[-13]	6.14[-13]	3.18[-13]	5.97[-13]	2.63[-16]
24.7064	6.82[-14]	1.34[-13]	6.35[-14]	2.71[-13]	4.33[-13]	2.27[-13]	4.26[-13]	1.99[-16]
32.1184	4.79[-14]	9.44[-14]	4.33[-14]	1.89[-13]	3.02[-13]	1.60[-13]	3.01[-13]	1.46[-16]
41.7539	3.34[-14]	6.57[-14]	2.95[-14]	1.31[-13]	2.10[-13]	1.12[-13]	2.10[-13]	1.05[-16]
54.2800	2.31[-14]	4.54[-14]	2.00[-14]	9.02[-14]	1.44[-13]	7.73[-14]	1.46[-13]	7.48[-17]
70.5640	1.59[-14]	3.12[-14]	1.36[-14]	6.18[-14]	9.89[-14]	5.32[-14]	1.00[-13]	5.25[-17]
91.7332	1.09[-14]	2.14[-14]	9.18[-15]	4.22[-14]	6.76[-14]	3.65[-14]	6.88[-14]	3.65[-17]
119.2532	7.43[-15]	1.46[-14]	6.21[-15]	2.87[-14]	4.60[-14]	2.49[-14]	4.70[-14]	2.52[-17]
$T_e$ eV	$2s^2 3p$ ( $1S$ )		$2s^2 4p$ ( $1S$ )		$2s^2 5p$ ( $1S$ )		$2s^2 6p$ ( $1S$ )	
	$2P_{1/2}$	$2P_{3/2}$	$2P_{1/2}$	$2P_{3/2}$	$2P_{1/2}$	$2P_{3/2}$	$2P_{1/2}$	$2P_{3/2}$
0.1000	4.95[-17]	8.36[-17]	3.57[-16]	6.01[-16]	2.73[-17]	4.58[-17]	4.06[-16]	6.03[-16]
0.1300	1.30[-16]	2.20[-16]	1.01[-15]	1.74[-15]	7.52[-17]	1.29[-16]	1.02[-15]	1.52[-15]
0.1690	2.81[-16]	4.87[-16]	2.36[-15]	4.27[-15]	1.69[-16]	3.00[-16]	2.05[-15]	3.09[-15]
0.2197	5.19[-16]	9.32[-16]	4.62[-15]	8.76[-15]	3.13[-16]	5.79[-16]	3.43[-15]	5.29[-15]
0.2856	8.25[-16]	1.54[-15]	7.56[-15]	1.49[-14]	4.84[-16]	9.28[-16]	4.89[-15]	7.74[-15]
0.3713	1.14[-15]	2.18[-15]	1.07[-14]	2.15[-14]	6.35[-16]	1.26[-15]	6.05[-15]	9.84[-15]
0.4827	1.39[-15]	2.71[-15]	1.42[-14]	2.90[-14]	7.33[-16]	1.48[-15]	6.66[-15]	1.11[-14]
0.6275	1.54[-15]	3.06[-15]	2.09[-14]	4.16[-14]	7.77[-16]	1.59[-15]	6.71[-15]	1.14[-14]
0.8157	1.65[-15]	3.30[-15]	3.47[-14]	6.65[-14]	8.17[-16]	1.68[-15]	6.42[-15]	1.10[-14]
1.0604	1.80[-15]	3.60[-15]	5.71[-14]	1.06[-13]	9.99[-16]	2.02[-15]	6.06[-15]	1.05[-14]
1.3786	2.09[-15]	4.13[-15]	8.36[-14]	1.53[-13]	1.77[-15]	3.49[-15]	5.81[-15]	1.02[-14]
1.7922	2.48[-15]	4.88[-15]	1.06[-13]	1.92[-13]	3.94[-15]	7.73[-15]	5.69[-15]	1.00[-14]
2.3298	2.86[-15]	5.62[-15]	1.18[-13]	2.13[-13]	8.15[-15]	1.60[-14]	5.62[-15]	1.01[-14]
3.0287	3.09[-15]	6.07[-15]	1.18[-13]	2.12[-13]	1.39[-14]	2.71[-14]	5.53[-15]	1.01[-14]
3.9374	3.09[-15]	6.07[-15]	1.09[-13]	1.94[-13]	1.95[-14]	3.81[-14]	5.34[-15]	9.97[-15]
5.1186	2.87[-15]	5.66[-15]	9.30[-14]	1.66[-13]	2.33[-14]	4.56[-14]	5.02[-15]	9.58[-15]
6.6542	2.51[-15]	4.95[-15]	7.55[-14]	1.35[-13]	2.44[-14]	4.79[-14]	4.54[-15]	8.84[-15]
8.6504	2.08[-15]	4.11[-15]	5.88[-14]	1.05[-13]	2.32[-14]	4.55[-14]	3.93[-15]	7.80[-15]
11.2455	1.65[-15]	3.27[-15]	4.43[-14]	7.90[-14]	2.04[-14]	4.00[-14]	3.27[-15]	6.57[-15]
14.6192	1.27[-15]	2.51[-15]	3.25[-14]	5.80[-14]	1.69[-14]	3.31[-14]	2.61[-15]	5.31[-15]
19.0049	9.47[-16]	1.88[-15]	2.34[-14]	4.18[-14]	1.33[-14]	2.61[-14]	2.02[-15]	4.14[-15]
24.7064	6.91[-16]	1.37[-15]	1.66[-14]	2.97[-14]	1.01[-14]	1.99[-14]	1.52[-15]	3.13[-15]
32.1184	4.96[-16]	9.84[-16]	1.17[-14]	2.08[-14]	7.50[-15]	1.47[-14]	1.11[-15]	2.31[-15]

$T_e$ eV	$2s^23p (^1S)$		$2s^24p (^1S)$		$2s^25p (^1S)$		$2s^26p (^1S)$	
	$^2P_{1/2}$	$^2P_{3/2}$	$^2P_{1/2}$	$^2P_{3/2}$	$^2P_{1/2}$	$^2P_{3/2}$	$^2P_{1/2}$	$^2P_{3/2}$
41.7539	3.51[-16]	6.97[-16]	8.11[-15]	1.45[-14]	5.43[-15]	1.07[-14]	8.04[-16]	1.67[-15]
54.2800	2.46[-16]	4.88[-16]	5.60[-15]	9.99[-15]	3.87[-15]	7.60[-15]	5.71[-16]	1.19[-15]
70.5640	1.71[-16]	3.39[-16]	3.85[-15]	6.86[-15]	2.73[-15]	5.35[-15]	4.01[-16]	8.38[-16]
91.7332	1.18[-16]	2.34[-16]	2.63[-15]	4.69[-15]	1.90[-15]	3.73[-15]	2.79[-16]	5.84[-16]
119.2532	8.08[-17]	1.61[-16]	1.79[-15]	3.20[-15]	1.31[-15]	2.58[-15]	1.93[-16]	4.04[-16]
$T_e$ eV	$2s2p3s (^3P)$			$2s2p3s (^3P)$		$2s2p3s (^1P)$		$2p^23p (^3P)$
	$^4P_{1/2}$	$^4P_{3/2}$	$^4P_{5/2}$	$^2P_{1/2}$	$^2P_{3/2}$	$^2P_{1/2}$	$^2P_{3/2}$	$^2P_{1/2}$
0.1000	6.03[-15]	2.69[-14]	9.59[-15]	1.31[-15]	2.04[-15]	1.43[-16]	2.56[-16]	2.21[-16]
0.1300	1.14[-14]	5.25[-14]	2.16[-14]	4.53[-15]	7.51[-15]	8.56[-16]	1.52[-15]	5.96[-16]
0.1690	1.79[-14]	8.58[-14]	4.13[-14]	1.24[-14]	2.19[-14]	3.26[-15]	5.81[-15]	1.32[-15]
0.2197	2.44[-14]	1.21[-13]	6.64[-14]	2.63[-14]	4.92[-14]	8.58[-15]	1.53[-14]	2.42[-15]
0.2856	2.94[-14]	1.50[-13]	9.07[-14]	4.46[-14]	8.68[-14]	1.69[-14]	3.03[-14]	3.75[-15]
0.3713	3.17[-14]	1.66[-13]	1.07[-13]	6.22[-14]	1.25[-13]	2.72[-14]	4.89[-14]	5.02[-15]
0.4827	3.13[-14]	1.66[-13]	1.13[-13]	7.46[-14]	1.53[-13]	3.86[-14]	7.03[-14]	6.03[-15]
0.6275	2.88[-14]	1.54[-13]	1.08[-13]	7.95[-14]	1.65[-13]	5.18[-14]	9.55[-14]	6.80[-15]
0.8157	2.57[-14]	1.36[-13]	9.63[-14]	7.83[-14]	1.65[-13]	6.65[-14]	1.24[-13]	7.42[-15]
1.0604	2.27[-14]	1.15[-13]	8.17[-14]	7.36[-14]	1.56[-13]	8.06[-14]	1.52[-13]	7.89[-15]
1.3786	2.05[-14]	9.68[-14]	6.73[-14]	6.77[-14]	1.44[-13]	9.07[-14]	1.72[-13]	8.11[-15]
1.7922	1.89[-14]	8.10[-14]	5.47[-14]	6.15[-14]	1.30[-13]	9.45[-14]	1.80[-13]	7.98[-15]
2.3298	1.74[-14]	6.77[-14]	4.41[-14]	5.49[-14]	1.16[-13]	9.16[-14]	1.74[-13]	7.48[-15]
3.0287	1.58[-14]	5.61[-14]	3.52[-14]	4.77[-14]	1.00[-13]	8.34[-14]	1.58[-13]	6.67[-15]
3.9374	1.38[-14]	4.57[-14]	2.78[-14]	4.01[-14]	8.42[-14]	7.19[-14]	1.36[-13]	5.69[-15]
5.1186	1.16[-14]	3.64[-14]	2.16[-14]	3.25[-14]	6.82[-14]	5.92[-14]	1.12[-13]	4.66[-15]
6.6542	9.43[-15]	2.82[-14]	1.65[-14]	2.55[-14]	5.34[-14]	4.70[-14]	8.93[-14]	3.68[-15]
8.6504	7.37[-15]	2.14[-14]	1.23[-14]	1.95[-14]	4.07[-14]	3.62[-14]	6.87[-14]	2.83[-15]
11.2455	5.59[-15]	1.58[-14]	9.04[-14]	1.45[-14]	3.02[-14]	2.71[-14]	5.15[-14]	2.12[-15]
14.6192	4.14[-15]	1.15[-14]	6.53[-15]	1.06[-14]	2.20[-14]	1.99[-14]	3.78[-14]	1.55[-15]
19.0049	3.00[-15]	8.24[-15]	4.65[-15]	7.56[-15]	1.58[-14]	1.44[-14]	2.73[-14]	1.12[-15]
24.7064	2.14[-15]	5.82[-15]	3.27[-15]	5.35[-15]	1.12[-14]	1.02[-14]	1.94[-14]	7.96[-16]
32.1184	1.51[-15]	4.08[-15]	2.28[-15]	3.75[-15]	7.81[-15]	7.18[-15]	1.36[-14]	5.59[-16]
41.7539	1.05[-15]	2.83[-15]	1.58[-15]	2.60[-15]	5.42[-15]	5.00[-15]	9.51[-15]	3.90[-16]
54.2800	7.31[-16]	1.95[-15]	1.09[-15]	1.79[-15]	3.74[-15]	3.46[-15]	6.58[-15]	2.70[-16]
70.5640	5.03[-16]	1.34[-15]	7.46[-16]	1.23[-15]	2.57[-15]	2.38[-15]	4.53[-15]	1.86[-16]
91.7332	3.45[-16]	9.15[-16]	5.10[-16]	8.42[-16]	1.75[-15]	1.63[-15]	3.10[-15]	1.27[-16]
119.2532	2.35[-16]	6.24[-16]	3.47[-16]	5.74[-16]	1.20[-15]	1.11[-15]	2.12[-15]	8.69[-17]
$T_e$ eV	$2s2p3d (^3P)$				$2s2p3d (^3P)$			
	$^4F_{3/2}$	$^4F_{5/2}$	$^4F_{7/2}$	$^4F_{9/2}$	$^4D_{1/2}$	$^4D_{3/2}$	$^4D_{5/2}$	$^4D_{7/2}$
0.1000	1.12[-12]	1.08[-12]	1.95[-12]	5.32[-12]	2.79[-13]	3.05[-13]	4.92[-13]	1.69[-12]
0.1300	9.47[-13]	9.71[-13]	1.80[-12]	4.83[-12]	2.38[-13]	2.66[-13]	4.41[-13]	1.54[-12]
0.1690	7.70[-13]	8.43[-13]	1.60[-12]	4.10[-12]	1.99[-13]	2.29[-13]	3.81[-13]	1.34[-12]
0.2197	6.10[-13]	7.20[-13]	1.39[-12]	3.30[-12]	1.70[-13]	2.02[-13]	3.26[-13]	1.12[-12]
0.2856	4.76[-13]	6.13[-13]	1.18[-12]	2.55[-12]	1.52[-13]	1.86[-13]	2.78[-13]	9.21[-13]
0.3713	3.70[-13]	5.26[-13]	9.93[-13]	1.92[-12]	1.44[-13]	1.80[-13]	2.39[-13]	7.49[-13]
0.4827	2.90[-13]	4.58[-13]	8.22[-13]	1.41[-12]	1.44[-13]	1.83[-13]	2.06[-13]	6.02[-13]
0.6275	2.31[-13]	4.03[-13]	6.72[-13]	1.02[-12]	1.45[-13]	1.86[-13]	1.77[-13]	4.79[-13]
0.8157	1.86[-13]	3.56[-13]	5.44[-13]	7.27[-13]	1.44[-13]	1.86[-13]	1.54[-13]	3.80[-13]
1.0604	1.53[-13]	3.15[-13]	4.43[-13]	5.18[-13]	1.38[-13]	1.80[-13]	1.37[-13]	3.07[-13]
1.3786	1.27[-13]	2.78[-13]	3.64[-13]	3.69[-13]	1.28[-13]	1.69[-13]	1.26[-13]	2.55[-13]
1.7922	1.08[-13]	2.45[-13]	3.04[-13]	2.64[-13]	1.15[-13]	1.53[-13]	1.19[-13]	2.19[-13]
2.3298	9.25[-14]	2.13[-13]	2.55[-13]	1.91[-13]	1.00[-13]	1.35[-13]	1.12[-13]	1.90[-13]
3.0287	7.83[-14]	1.81[-13]	2.12[-13]	1.38[-13]	8.46[-14]	1.15[-13]	1.03[-13]	1.63[-13]
3.9374	6.49[-14]	1.50[-13]	1.73[-13]	9.99[-14]	6.92[-14]	9.43[-14]	9.12[-14]	1.37[-13]
5.1186	5.23[-14]	1.20[-13]	1.37[-13]	7.20[-14]	5.49[-14]	7.50[-14]	7.71[-14]	1.11[-13]

$T_e$ eV	$2s2p3d$ ( $^3P$ )					$2s2p3d$ ( $^3P$ )		
	$^4F_{3/2}$	$^4F_{5/2}$	$^4F_{7/2}$	$^4F_{9/2}$	$^4D_{1/2}$	$^4D_{3/2}$	$^4D_{5/2}$	$^4D_{7/2}$
6.6542	4.10[-14]	9.28[-14]	1.06[-13]	5.15[-14]	4.23[-14]	5.78[-14]	6.25[-14]	8.77[-14]
8.6504	3.12[-14]	7.01[-14]	7.96[-14]	3.65[-14]	3.17[-14]	4.35[-14]	4.89[-14]	6.71[-14]
11.2455	2.32[-14]	5.18[-14]	5.87[-14]	2.57[-14]	2.33[-14]	3.20[-14]	3.70[-14]	5.00[-14]
14.6192	1.69[-14]	3.75[-14]	4.25[-14]	1.79[-14]	1.68[-14]	2.31[-14]	2.74[-14]	3.65[-14]
19.0049	1.22[-14]	2.68[-14]	3.03[-14]	1.24[-14]	1.20[-14]	1.64[-14]	1.98[-14]	2.62[-14]
24.7064	8.60[-15]	1.89[-14]	2.13[-14]	8.58[-15]	8.43[-15]	1.16[-14]	1.41[-14]	1.85[-14]
32.1184	6.02[-15]	1.32[-14]	1.49[-14]	5.89[-15]	5.88[-15]	8.05[-15]	9.96[-15]	1.30[-14]
41.7539	4.18[-15]	9.12[-15]	1.03[-14]	4.03[-15]	4.07[-15]	5.57[-15]	6.95[-15]	9.02[-15]
54.2800	2.89[-15]	6.28[-15]	7.10[-15]	2.75[-15]	2.80[-15]	3.83[-15]	4.81[-15]	6.22[-15]
70.5640	1.98[-15]	4.31[-15]	4.86[-15]	1.87[-15]	1.92[-15]	2.63[-15]	3.31[-15]	4.27[-15]
91.7332	1.36[-15]	2.94[-15]	3.32[-15]	1.27[-15]	1.31[-15]	1.79[-15]	2.27[-15]	2.92[-15]
119.2532	9.24[-16]	2.00[-15]	2.26[-15]	8.61[-16]	8.91[-16]	1.22[-15]	1.55[-15]	1.99[-15]
$T_e$ eV	$2s2p3d$ ( $^3P$ )			$2s2p3d$ ( $^3P$ )		$2s2p3d$ ( $^1P$ )		$2p^23p$ ( $^3P$ )
	$^4P_{1/2}$	$^4P_{3/2}$	$^4P_{5/2}$	$^2P_{1/2}$	$^2P_{3/2}$	$^2P_{1/2}$	$^2P_{3/2}$	$^2P_{3/2}$
0.1000	3.88[-15]	1.91[-14]	9.42[-15]	1.87[-15]	3.88[-15]	2.81[-17]	5.42[-17]	3.82[-16]
0.1300	7.24[-15]	3.67[-14]	1.92[-14]	4.93[-15]	9.65[-15]	6.57[-17]	1.26[-16]	1.04[-15]
0.1690	1.14[-14]	5.94[-14]	3.30[-14]	1.07[-14]	1.96[-14]	1.22[-16]	2.36[-16]	2.34[-15]
0.2197	1.57[-14]	8.42[-14]	4.95[-14]	1.96[-14]	3.45[-14]	1.95[-16]	3.80[-16]	4.44[-15]
0.2856	1.96[-14]	1.07[-13]	6.58[-14]	3.16[-14]	5.44[-14]	2.77[-16]	5.46[-16]	7.06[-15]
0.3713	2.25[-14]	1.24[-13]	7.87[-14]	4.57[-14]	7.89[-14]	3.70[-16]	7.32[-16]	9.65[-15]
0.4827	2.43[-14]	1.33[-13]	8.63[-14]	6.17[-14]	1.09[-13]	5.61[-16]	1.08[-15]	1.18[-14]
0.6275	2.50[-14]	1.35[-13]	8.87[-14]	8.00[-14]	1.45[-13]	1.27[-15]	2.34[-15]	1.35[-14]
0.8157	2.48[-14]	1.31[-13]	8.78[-14]	1.00[-13]	1.86[-13]	3.61[-15]	6.58[-15]	1.48[-14]
1.0604	2.43[-14]	1.25[-13]	8.65[-14]	1.19[-13]	2.25[-13]	9.16[-15]	1.69[-14]	1.58[-14]
1.3786	2.37[-14]	1.17[-13]	8.65[-14]	1.33[-13]	2.54[-13]	1.86[-14]	3.48[-14]	1.61[-14]
1.7922	2.30[-14]	1.10[-13]	8.75[-14]	1.38[-13]	2.67[-13]	3.03[-14]	5.74[-14]	1.58[-14]
2.3298	2.19[-14]	1.01[-13]	8.72[-14]	1.34[-13]	2.61[-13]	4.11[-14]	7.84[-14]	1.47[-14]
3.0287	2.01[-14]	9.02[-14]	8.35[-14]	1.22[-13]	2.39[-13]	4.79[-14]	9.20[-14]	1.30[-14]
3.9374	1.77[-14]	7.77[-14]	7.61[-14]	1.06[-13]	2.07[-13]	4.96[-14]	9.57[-14]	1.10[-14]
5.1186	1.49[-14]	6.44[-14]	6.57[-14]	8.73[-14]	1.71[-13]	4.67[-14]	9.05[-14]	9.01[-15]
6.6542	1.21[-14]	5.14[-14]	5.42[-14]	6.92[-14]	1.36[-13]	4.09[-14]	7.95[-14]	7.10[-15]
8.6504	9.41[-15]	3.97[-14]	4.28[-14]	5.30[-14]	1.04[-13]	3.39[-14]	6.59[-14]	5.44[-15]
11.2455	7.12[-15]	2.99[-14]	3.28[-14]	3.96[-14]	7.78[-14]	2.68[-14]	5.22[-14]	4.06[-15]
14.6192	5.26[-15]	2.19[-14]	2.44[-14]	2.89[-14]	5.69[-14]	2.04[-14]	3.99[-14]	2.98[-15]
19.0049	3.80[-15]	1.58[-14]	1.77[-14]	2.08[-14]	4.08[-14]	1.52[-14]	2.96[-14]	2.14[-15]
24.7064	2.71[-15]	1.12[-14]	1.27[-14]	1.47[-14]	2.89[-14]	1.10[-14]	2.15[-14]	1.52[-15]
32.1184	1.91[-15]	7.89[-15]	8.97[-15]	1.03[-14]	2.03[-14]	7.88[-15]	1.54[-14]	1.07[-15]
41.7539	1.33[-15]	5.49[-15]	6.27[-15]	7.15[-15]	1.41[-14]	5.56[-15]	1.09[-14]	7.46[-16]
54.2800	9.21[-16]	3.80[-15]	4.35[-15]	4.93[-15]	9.71[-15]	3.88[-15]	7.59[-15]	5.16[-16]
70.5640	6.34[-16]	2.61[-15]	3.00[-15]	3.39[-15]	6.67[-15]	2.69[-15]	5.26[-15]	3.55[-16]
91.7332	4.34[-16]	1.79[-15]	2.06[-15]	2.32[-15]	4.56[-15]	1.85[-15]	3.62[-15]	2.43[-16]
119.2532	2.96[-16]	1.22[-15]	1.40[-15]	1.58[-15]	3.11[-15]	1.27[-15]	2.48[-15]	1.66[-16]
$T_e$ eV	$2s2p3d$ ( $^3P$ )		$2s2p3d$ ( $^3P$ )		$2s2p3d$ ( $^1P$ )		$2s2p3d$ ( $^1P$ )	
	$^2F_{5/2}$	$^2F_{7/2}$	$^2D_{3/2}$	$^2D_{5/2}$	$^2F_{5/2}$	$^2F_{7/2}$	$^2D_{3/2}$	$^2D_{5/2}$
0.1000	1.80[-15]	1.59[-15]	2.66[-14]	4.05[-14]	7.45[-18]	1.14[-17]	1.37[-16]	1.71[-16]
0.1300	8.30[-15]	7.11[-15]	6.15[-14]	9.12[-14]	3.70[-17]	5.17[-17]	3.83[-16]	4.44[-16]
0.1690	2.69[-14]	2.45[-14]	1.10[-13]	1.58[-13]	1.20[-16]	1.56[-16]	8.30[-16]	9.15[-16]
0.2197	6.62[-14]	6.48[-14]	1.64[-13]	2.24[-13]	2.89[-16]	3.47[-16]	1.45[-15]	1.56[-15]
0.2856	1.33[-13]	1.38[-13]	2.11[-13]	2.77[-13]	5.65[-16]	6.33[-16]	2.10[-15]	2.25[-15]
0.3713	2.25[-13]	2.43[-13]	2.47[-13]	3.11[-13]	1.01[-15]	1.03[-15]	2.69[-15]	2.91[-15]
0.4827	3.26[-13]	3.65[-13]	2.70[-13]	3.29[-13]	1.87[-15]	1.67[-15]	3.45[-15]	3.90[-15]
0.6275	4.16[-13]	4.77[-13]	2.84[-13]	3.39[-13]	4.09[-15]	3.14[-15]	5.39[-15]	6.68[-15]
0.8157	4.75[-13]	5.56[-13]	2.89[-13]	3.43[-13]	1.04[-14]	7.36[-15]	1.04[-14]	1.42[-14]



$T_e$ eV	$2s2p3d$ ( $^3P$ )		$2s2p3d$ ( $^3P$ )		$2s2p3d$ ( $^1P$ )		$2s2p3d$ ( $^1P$ )	
	$^2F_{5/2}$	$^2F_{7/2}$	$^2D_{3/2}$	$^2D_{5/2}$	$^2F_{5/2}$	$^2F_{7/2}$	$^2D_{3/2}$	$^2D_{5/2}$
1.0604	4.99[-13]	5.94[-13]	2.89[-13]	3.44[-13]	2.59[-14]	1.83[-14]	2.02[-14]	3.01[-14]
1.3786	4.91[-13]	5.91[-13]	2.83[-13]	3.40[-13]	5.56[-14]	3.97[-14]	3.50[-14]	5.53[-14]
1.7922	4.57[-13]	5.58[-13]	2.70[-13]	3.28[-13]	9.87[-14]	7.13[-14]	5.18[-14]	8.57[-14]
2.3298	4.07[-13]	5.02[-13]	2.49[-13]	3.06[-13]	1.46[-13]	1.07[-13]	6.63[-14]	1.13[-13]
3.0287	3.48[-13]	4.32[-13]	2.20[-13]	2.73[-13]	1.87[-13]	1.37[-13]	7.48[-14]	1.31[-13]
3.9374	2.86[-13]	3.58[-13]	1.86[-13]	2.34[-13]	2.10[-13]	1.55[-13]	7.61[-14]	1.35[-13]
5.1186	2.27[-13]	2.86[-13]	1.51[-13]	1.91[-13]	2.14[-13]	1.58[-13]	7.11[-14]	1.27[-13]
6.6542	1.75[-13]	2.21[-13]	1.19[-13]	1.51[-13]	1.99[-13]	1.48[-13]	6.19[-14]	1.11[-13]
8.6504	1.31[-13]	1.67[-13]	9.02[-14]	1.16[-13]	1.74[-13]	1.29[-13]	5.11[-14]	9.20[-14]
11.2455	9.66[-14]	1.23[-13]	6.69[-14]	8.62[-14]	1.44[-13]	1.07[-13]	4.03[-14]	7.28[-14]
14.6192	6.97[-14]	8.89[-14]	4.87[-14]	6.28[-14]	1.14[-13]	8.43[-14]	3.07[-14]	5.55[-14]
19.0049	4.96[-14]	6.33[-14]	3.48[-14]	4.51[-14]	8.66[-14]	6.43[-14]	2.28[-14]	4.12[-14]
24.7064	3.49[-14]	4.46[-14]	2.46[-14]	3.19[-14]	6.43[-14]	4.78[-14]	1.65[-14]	3.00[-14]
32.1184	2.43[-14]	3.11[-14]	1.72[-14]	2.23[-14]	4.68[-14]	3.47[-14]	1.18[-14]	2.14[-14]
41.7539	1.68[-14]	2.15[-14]	1.19[-14]	1.55[-14]	3.34[-14]	2.48[-14]	8.33[-15]	1.51[-14]
54.2800	1.16[-14]	1.48[-14]	8.21[-15]	1.07[-14]	2.36[-14]	1.75[-14]	5.81[-15]	1.05[-14]
70.5640	7.92[-15]	1.02[-14]	5.63[-15]	7.33[-15]	1.65[-14]	1.22[-14]	4.03[-15]	7.29[-15]
91.7332	5.40[-15]	6.93[-15]	3.85[-15]	5.01[-15]	1.14[-14]	8.48[-15]	2.77[-15]	5.02[-15]
119.2532	3.68[-15]	4.72[-15]	2.62[-15]	3.42[-15]	7.85[-15]	5.84[-15]	1.90[-15]	3.44[-15]
$T_e$ eV	$2s^24f$ ( $^1S$ )		$2s^25f$ ( $^1S$ )		$2s^26f$ ( $^1S$ )		$2s^26h$ ( $^1S$ )	
	$^2F_{5/2}$	$^2F_{7/2}$	$^2F_{5/2}$	$^2F_{7/2}$	$^2F_{5/2}$	$^2F_{7/2}$	$^2H_{9/2}$	$^2H_{11/2}$
0.1000	3.77[-17]	2.81[-17]	3.47[-18]	2.06[-18]	3.37[-18]	2.97[-18]	1.27[-28]	1.55[-28]
0.1300	1.69[-16]	1.39[-16]	1.47[-17]	9.31[-18]	1.81[-17]	1.74[-17]	1.07[-25]	1.31[-25]
0.1690	5.04[-16]	4.47[-16]	4.11[-17]	2.77[-17]	6.36[-17]	6.51[-17]	1.75[-23]	2.13[-23]
0.2197	1.11[-15]	1.06[-15]	8.50[-17]	6.11[-17]	1.64[-16]	1.76[-16]	8.02[-22]	9.80[-22]
0.2856	1.99[-15]	2.05[-15]	1.42[-16]	1.10[-16]	3.42[-16]	3.78[-16]	1.39[-20]	1.70[-20]
0.3713	3.30[-15]	3.70[-15]	2.09[-16]	1.81[-16]	6.11[-16]	6.98[-16]	1.14[-19]	1.40[-19]
0.4827	5.74[-15]	7.01[-15]	2.99[-16]	3.06[-16]	1.01[-15]	1.22[-15]	5.28[-19]	6.47[-19]
0.6275	1.08[-14]	1.42[-14]	4.82[-16]	6.09[-16]	1.74[-15]	2.24[-15]	1.60[-18]	1.96[-18]
0.8157	2.12[-14]	2.92[-14]	1.02[-15]	1.46[-15]	3.36[-15]	4.59[-15]	4.25[-18]	5.19[-18]
1.0604	4.06[-14]	5.75[-14]	2.55[-15]	3.70[-15]	7.04[-15]	9.78[-15]	2.82[-17]	3.40[-17]
1.3786	7.10[-14]	1.02[-13]	6.04[-15]	8.56[-15]	1.39[-14]	1.93[-14]	2.93[-16]	3.51[-16]
1.7922	1.08[-13]	1.56[-13]	1.24[-14]	1.72[-14]	2.42[-14]	3.33[-14]	1.87[-15]	2.24[-15]
2.3298	1.42[-13]	2.06[-13]	2.16[-14]	2.95[-14]	3.69[-14]	5.04[-14]	7.22[-15]	8.67[-15]
3.0287	1.63[-13]	2.36[-13]	3.21[-14]	4.34[-14]	5.05[-14]	6.86[-14]	1.87[-14]	2.25[-14]
3.9374	1.67[-13]	2.43[-13]	4.12[-14]	5.55[-14]	6.26[-14]	8.47[-14]	3.55[-14]	4.27[-14]
5.1186	1.56[-13]	2.27[-13]	4.65[-14]	6.25[-14]	7.08[-14]	9.54[-14]	5.32[-14]	6.38[-14]
6.6542	1.36[-13]	1.98[-13]	4.72[-14]	6.33[-14]	7.31[-14]	9.84[-14]	6.62[-14]	7.95[-14]
8.6504	1.12[-13]	1.62[-13]	4.39[-14]	5.88[-14]	6.97[-14]	9.37[-14]	7.16[-14]	8.59[-14]
11.2455	8.80[-14]	1.28[-13]	3.80[-14]	5.09[-14]	6.20[-14]	8.33[-14]	6.94[-14]	8.33[-14]
14.6192	6.68[-14]	9.69[-14]	3.11[-14]	4.17[-14]	5.21[-14]	6.99[-14]	6.19[-14]	7.43[-14]
19.0049	4.94[-14]	7.16[-14]	2.44[-14]	3.27[-14]	4.17[-14]	5.59[-14]	5.18[-14]	6.21[-14]
24.7064	3.57[-14]	5.18[-14]	1.85[-14]	2.48[-14]	3.22[-14]	4.31[-14]	4.12[-14]	4.94[-14]
32.1184	2.54[-14]	3.69[-14]	1.37[-14]	1.83[-14]	2.41[-14]	3.23[-14]	3.16[-14]	3.79[-14]
41.7539	1.79[-14]	2.60[-14]	9.89[-15]	1.32[-14]	1.76[-14]	2.36[-14]	2.35[-14]	2.82[-14]
54.2800	1.25[-14]	1.81[-14]	7.04[-15]	9.41[-15]	1.27[-14]	1.70[-14]	1.71[-14]	2.05[-14]
70.5640	8.62[-15]	1.25[-14]	4.95[-15]	6.62[-15]	8.96[-15]	1.20[-14]	1.22[-14]	1.46[-14]
91.7332	5.93[-15]	8.60[-15]	3.45[-15]	4.61[-15]	6.28[-15]	8.41[-15]	8.61[-15]	1.03[-14]
119.2532	4.06[-15]	5.89[-15]	2.38[-15]	3.19[-15]	4.36[-15]	5.84[-15]	6.01[-15]	7.21[-15]
$T_e$ eV	$2s^27p$ ( $^1S$ )		$2s^27f$ ( $^1S$ )		$2s^27h$ ( $^1S$ )		$2p^23p$ ( $^3P$ )	
	$^2P_{1/2}$	$^2P_{3/2}$	$^2F_{5/2}$	$^2F_{7/2}$	$^2H_{9/2}$	$^2H_{11/2}$	$^2D_{3/2}$	$^2D_{5/2}$
0.1000	3.13[-17]	5.47[-17]	2.87[-18]	2.75[-18]	2.82[-28]	3.42[-28]	1.00[-16]	7.66[-17]
0.1300	8.85[-17]	1.58[-16]	1.66[-17]	1.71[-17]	2.38[-25]	2.89[-25]	3.71[-16]	2.73[-16]

$T_e$ eV	$2s^27p$ ( $^1S$ )		$2s^27f$ ( $^1S$ )		$2s^27h$ ( $^1S$ )		$2p^23p$ ( $^3P$ )	
	$^2P_{1/2}$	$^2P_{3/2}$	$^2F_{5/2}$	$^2F_{7/2}$	$^2H_{9/2}$	$^2H_{11/2}$	$^2D_{3/2}$	$^2D_{5/2}$
0.1690	2.04[-16]	3.78[-16]	6.24[-17]	6.73[-17]	3.87[-23]	4.72[-23]	9.70[-16]	7.13[-16]
0.2197	3.85[-16]	7.42[-16]	1.71[-16]	1.90[-16]	1.77[-21]	2.17[-21]	1.91[-15]	1.44[-15]
0.2856	6.00[-16]	1.20[-15]	3.69[-16]	4.19[-16]	3.08[-20]	3.76[-20]	3.03[-15]	2.38[-15]
0.3713	7.90[-16]	1.62[-15]	6.51[-16]	7.49[-16]	2.52[-19]	3.09[-19]	4.14[-15]	3.46[-15]
0.4827	9.05[-16]	1.90[-15]	9.66[-16]	1.13[-15]	1.17[-18]	1.43[-18]	5.17[-15]	4.67[-15]
0.6275	9.39[-16]	1.99[-15]	1.25[-15]	1.48[-15]	3.51[-18]	4.30[-18]	6.17[-15]	6.05[-15]
0.8157	9.32[-16]	1.98[-15]	1.49[-15]	1.80[-15]	7.86[-18]	9.62[-18]	7.23[-15]	7.64[-15]
1.0604	9.59[-16]	2.02[-15]	1.72[-15]	2.13[-15]	1.87[-17]	2.28[-17]	8.32[-15]	9.28[-15]
1.3786	1.07[-15]	2.22[-15]	2.00[-15]	2.54[-15]	1.11[-16]	1.33[-16]	9.24[-15]	1.07[-14]
1.7922	1.30[-15]	2.63[-15]	2.35[-15]	3.07[-15]	7.97[-16]	9.57[-16]	9.72[-15]	1.15[-14]
2.3298	1.68[-15]	3.37[-15]	2.81[-15]	3.72[-15]	3.70[-15]	4.45[-15]	9.61[-15]	1.15[-14]
3.0287	2.30[-15]	4.60[-15]	3.39[-15]	4.52[-15]	1.12[-14]	1.34[-14]	8.92[-15]	1.07[-14]
3.9374	3.16[-15]	6.34[-15]	4.10[-15]	5.47[-15]	2.40[-14]	2.88[-14]	7.82[-15]	9.46[-15]
5.1186	4.08[-15]	8.20[-15]	4.77[-15]	6.38[-15]	3.94[-14]	4.73[-14]	6.52[-15]	7.90[-15]
6.6542	4.77[-15]	9.60[-15]	5.21[-15]	6.96[-15]	5.27[-14]	6.33[-14]	5.21[-15]	6.33[-15]
8.6504	5.03[-15]	1.01[-14]	5.26[-15]	7.02[-15]	6.03[-14]	7.23[-14]	4.02[-15]	4.89[-15]
11.2455	4.84[-15]	9.78[-15]	4.92[-15]	6.57[-15]	6.10[-14]	7.32[-14]	3.02[-15]	3.67[-15]
14.6192	4.32[-15]	8.73[-15]	4.31[-15]	5.75[-15]	5.62[-14]	6.74[-14]	2.22[-15]	2.69[-15]
19.0049	3.62[-15]	7.32[-15]	3.58[-15]	4.77[-15]	4.82[-14]	5.78[-14]	1.60[-15]	1.94[-15]
24.7064	2.89[-15]	5.85[-15]	2.83[-15]	3.78[-15]	3.91[-14]	4.69[-14]	1.13[-15]	1.38[-15]
32.1184	2.23[-15]	4.50[-15]	2.17[-15]	2.89[-15]	3.04[-14]	3.65[-14]	7.97[-16]	9.69[-16]
41.7539	1.66[-15]	3.36[-15]	1.61[-15]	2.15[-15]	2.29[-14]	2.75[-14]	5.55[-16]	6.75[-16]
54.2800	1.21[-15]	2.45[-15]	1.17[-15]	1.56[-15]	1.68[-14]	2.01[-14]	3.83[-16]	4.66[-16]
70.5640	8.68[-16]	1.76[-15]	8.38[-16]	1.12[-15]	1.21[-14]	1.45[-14]	2.64[-16]	3.21[-16]
91.7332	6.13[-16]	1.24[-15]	5.91[-16]	7.87[-16]	8.57[-15]	1.03[-14]	1.80[-16]	2.19[-16]
119.2532	4.29[-16]	8.67[-16]	4.13[-16]	5.50[-16]	6.01[-15]	7.21[-15]	1.23[-16]	1.50[-16]
$T_e$ eV	$2s^28p$ ( $^1S$ )		$2s^28f$ ( $^1S$ )		$2s^28h$ ( $^1S$ )		$2s^28k$ ( $^1S$ )	
	$^2P_{1/2}$	$^2P_{3/2}$	$^2F_{5/2}$	$^2F_{7/2}$	$^2H_{9/2}$	$^2H_{11/2}$	$^2K_{13/2}$	$^2K_{15/2}$
0.1000	1.42[-17]	2.56[-17]	2.31[-17]	2.86[-17]	8.58[-28]	1.04[-27]	3.31[-74]	3.82[-74]
0.1300	4.26[-17]	7.82[-17]	1.27[-16]	1.74[-16]	7.24[-25]	8.82[-25]	9.33[-61]	1.08[-60]
0.1690	1.05[-16]	1.98[-16]	4.78[-16]	7.02[-16]	1.18[-22]	1.44[-22]	1.91[-50]	2.21[-50]
0.2197	2.09[-16]	4.07[-16]	1.37[-15]	2.11[-15]	5.41[-21]	6.61[-21]	2.10[-42]	2.42[-42]
0.2856	3.40[-16]	6.80[-16]	3.15[-15]	5.01[-15]	9.37[-20]	1.15[-19]	1.26[-35]	1.44[-35]
0.3713	4.63[-16]	9.45[-16]	5.86[-15]	9.53[-15]	7.68[-19]	9.41[-19]	3.77[-30]	4.31[-30]
0.4827	5.46[-16]	1.13[-15]	9.01[-15]	1.49[-14]	3.55[-18]	4.36[-18]	6.07[-26]	6.94[-26]
0.6275	5.81[-16]	1.21[-15]	1.18[-14]	1.97[-14]	1.07[-17]	1.31[-17]	9.63[-23]	1.10[-22]
0.8157	5.89[-16]	1.23[-15]	1.35[-14]	2.28[-14]	2.37[-17]	2.91[-17]	2.55[-20]	2.91[-20]
1.0604	5.99[-16]	1.25[-15]	1.41[-14]	2.40[-14]	4.42[-17]	5.41[-17]	1.70[-18]	1.94[-18]
1.3786	6.34[-16]	1.31[-15]	1.38[-14]	2.35[-14]	1.08[-16]	1.31[-16]	3.93[-17]	4.50[-17]
1.7922	7.16[-16]	1.47[-15]	1.28[-14]	2.20[-14]	5.23[-16]	6.30[-16]	4.02[-16]	4.60[-16]
2.3298	9.34[-16]	1.90[-15]	1.20[-14]	2.04[-14]	2.48[-15]	2.97[-15]	2.20[-15]	2.51[-15]
3.0287	1.45[-15]	2.93[-15]	1.18[-14]	1.96[-14]	8.08[-15]	9.70[-15]	7.41[-15]	8.46[-15]
3.9374	2.36[-15]	4.75[-15]	1.30[-14]	2.04[-14]	1.86[-14]	2.23[-14]	1.72[-14]	1.97[-14]
5.1186	3.50[-15]	7.04[-15]	1.50[-14]	2.24[-14]	3.24[-14]	3.89[-14]	3.01[-14]	3.44[-14]
6.6542	4.53[-15]	9.11[-15]	1.71[-14]	2.44[-14]	4.54[-14]	5.45[-14]	4.22[-14]	4.83[-14]
8.6504	5.14[-15]	1.03[-14]	1.81[-14]	2.52[-14]	5.37[-14]	6.45[-14]	5.01[-14]	5.72[-14]
11.2455	5.21[-15]	1.05[-14]	1.77[-14]	2.42[-14]	5.59[-14]	6.70[-14]	5.21[-14]	5.95[-14]
14.6192	4.82[-15]	9.69[-15]	1.60[-14]	2.17[-14]	5.26[-14]	6.31[-14]	4.90[-14]	5.60[-14]
19.0049	4.15[-15]	8.35[-15]	1.37[-14]	1.84[-14]	4.58[-14]	5.50[-14]	4.27[-14]	4.88[-14]
24.7064	3.39[-15]	6.81[-15]	1.11[-14]	1.48[-14]	3.76[-14]	4.52[-14]	3.51[-14]	4.01[-14]
32.1184	2.64[-15]	5.32[-15]	8.60[-15]	1.15[-14]	2.96[-14]	3.55[-14]	2.76[-14]	3.15[-14]
41.7539	2.00[-15]	4.01[-15]	6.48[-15]	8.63[-15]	2.24[-14]	2.69[-14]	2.09[-14]	2.39[-14]
54.2800	1.47[-15]	2.95[-15]	4.75[-15]	6.33[-15]	1.65[-14]	1.98[-14]	1.54[-14]	1.76[-14]

$T_e$ eV	$2s^28p (^1S)$		$2s^28f (^1S)$		$2s^28h (^1S)$		$2s^28k (^1S)$	
	$^2P_{1/2}$	$^2P_{3/2}$	$^2F_{5/2}$	$^2F_{7/2}$	$^2H_{9/2}$	$^2H_{11/2}$	$^2K_{13/2}$	$^2K_{15/2}$
70.5640	1.06[-15]	2.13[-15]	3.42[-15]	4.55[-15]	1.20[-14]	1.43[-14]	1.12[-14]	1.27[-14]
91.7332	7.53[-16]	1.51[-15]	2.43[-15]	3.23[-15]	8.50[-15]	1.02[-14]	7.94[-15]	9.07[-15]
119.2532	5.28[-16]	1.06[-15]	1.70[-15]	2.26[-15]	5.97[-15]	7.17[-15]	5.58[-15]	6.37[-15]
$T_e$ eV	$2s2p4s (^3P)$			$2s2p4s (^3P)$		$2s2p4d (^3P)$		
	$^4P_{1/2}$	$^4P_{3/2}$	$^4P_{5/2}$	$^2P_{1/2}$	$^2P_{3/2}$	$^4P_{1/2}$	$^4P_{3/2}$	$^4P_{5/2}$
0.1000	1.49[-15]	6.66[-15]	2.36[-15]	1.26[-15]	2.29[-15]	2.45[-15]	1.16[-14]	6.65[-15]
0.1300	2.82[-15]	1.31[-14]	5.36[-15]	3.19[-15]	5.82[-15]	4.39[-15]	2.12[-14]	1.08[-14]
0.1690	4.47[-15]	2.17[-14]	1.03[-14]	6.46[-15]	1.20[-14]	6.76[-15]	3.29[-14]	1.69[-14]
0.2197	6.14[-15]	3.10[-14]	1.66[-14]	1.09[-14]	2.09[-14]	9.14[-15]	4.47[-14]	2.42[-14]
0.2856	7.44[-15]	3.89[-14]	2.29[-14]	1.57[-14]	3.11[-14]	1.10[-14]	5.42[-14]	3.10[-14]
0.3713	8.09[-15]	4.35[-14]	2.72[-14]	1.96[-14]	3.99[-14]	1.21[-14]	5.95[-14]	3.57[-14]
0.4827	8.03[-15]	4.40[-14]	2.87[-14]	2.17[-14]	4.52[-14]	1.22[-14]	6.01[-14]	3.73[-14]
0.6275	7.49[-15]	4.12[-14]	2.76[-14]	2.19[-14]	4.66[-14]	1.16[-14]	5.68[-14]	3.61[-14]
0.8157	6.80[-15]	3.66[-14]	2.48[-14]	2.09[-14]	4.50[-14]	1.05[-14]	5.14[-14]	3.35[-14]
1.0604	6.25[-15]	3.17[-14]	2.12[-14]	1.94[-14]	4.21[-14]	9.49[-15]	4.57[-14]	3.10[-14]
1.3786	5.93[-15]	2.74[-14]	1.78[-14]	1.79[-14]	3.91[-14]	8.66[-15]	4.09[-14]	2.96[-14]
1.7922	5.80[-15]	2.39[-14]	1.48[-14]	1.66[-14]	3.62[-14]	8.03[-15]	3.70[-14]	2.91[-14]
2.3298	5.69[-15]	2.12[-14]	1.23[-14]	1.53[-14]	3.32[-14]	7.46[-15]	3.35[-14]	2.88[-14]
3.0287	5.46[-15]	1.89[-14]	1.03[-14]	1.39[-14]	2.98[-14]	6.78[-15]	2.97[-14]	2.76[-14]
3.9374	5.04[-15]	1.66[-14]	8.44[-15]	1.22[-14]	2.61[-14]	5.95[-15]	2.56[-14]	2.53[-14]
5.1186	4.45[-15]	1.43[-14]	6.82[-15]	1.05[-14]	2.22[-14]	5.02[-15]	2.13[-14]	2.20[-14]
6.6542	3.75[-15]	1.19[-14]	5.39[-15]	8.70[-15]	1.83[-14]	4.06[-15]	1.71[-14]	1.83[-14]
8.6504	3.04[-15]	9.60[-15]	4.15[-15]	7.00[-15]	1.47[-14]	3.17[-15]	1.32[-14]	1.45[-14]
11.2455	2.37[-15]	7.49[-15]	3.12[-15]	5.47[-15]	1.14[-14]	2.41[-15]	9.97[-15]	1.12[-14]
14.6192	1.79[-15]	5.69[-15]	2.30[-15]	4.16[-15]	8.64[-15]	1.78[-15]	7.34[-15]	8.33[-15]
19.0049	1.32[-15]	4.21[-15]	1.67[-15]	3.09[-15]	6.40[-15]	1.29[-15]	5.31[-15]	6.08[-15]
24.7064	9.60[-16]	3.06[-15]	1.19[-15]	2.25[-15]	4.66[-15]	9.20[-16]	3.78[-15]	4.36[-15]
32.1184	6.84[-16]	2.19[-15]	8.40[-16]	1.61[-15]	3.33[-15]	6.48[-16]	2.66[-15]	3.09[-15]
41.7539	4.82[-16]	1.54[-15]	5.87[-16]	1.14[-15]	2.36[-15]	4.52[-16]	1.85[-15]	2.16[-15]
54.2800	3.36[-16]	1.08[-15]	4.06[-16]	8.00[-16]	1.65[-15]	3.13[-16]	1.28[-15]	1.50[-15]
70.5640	2.33[-16]	7.48[-16]	2.80[-16]	5.56[-16]	1.14[-15]	2.16[-16]	8.80[-16]	1.03[-15]
91.7332	1.60[-16]	5.15[-16]	1.92[-16]	3.83[-16]	7.89[-16]	1.48[-16]	6.03[-16]	7.09[-16]
119.2532	1.10[-16]	3.53[-16]	1.31[-16]	2.63[-16]	5.42[-16]	1.01[-16]	4.11[-16]	4.85[-16]
$T_e$ eV	$2s2p4d (^3P)$				$2s2p4d (^3P)$			
	$^4F_{3/2}$	$^4F_{5/2}$	$^4F_{7/2}$	$^4F_{9/2}$	$^4D_{1/2}$	$^4D_{3/2}$	$^4D_{5/2}$	$^4D_{7/2}$
0.1000	1.34[-14]	1.97[-14]	4.53[-14]	5.77[-14]	1.07[-13]	1.15[-13]	1.90[-13]	6.88[-13]
0.1300	1.27[-14]	2.21[-14]	5.00[-14]	5.25[-14]	9.00[-14]	9.83[-14]	1.67[-13]	6.27[-13]
0.1690	1.19[-14]	2.44[-14]	5.41[-14]	4.48[-14]	7.32[-14]	8.29[-14]	1.41[-13]	5.36[-13]
0.2197	1.12[-14]	2.66[-14]	5.70[-14]	3.65[-14]	5.93[-14]	7.10[-14]	1.18[-13]	4.39[-13]
0.2856	1.05[-14]	2.96[-14]	5.85[-14]	2.89[-14]	4.89[-14]	6.34[-14]	9.96[-14]	3.50[-13]
0.3713	9.90[-15]	3.43[-14]	5.86[-14]	2.26[-14]	4.21[-14]	5.90[-14]	8.46[-14]	2.73[-13]
0.4827	9.52[-15]	4.01[-14]	5.75[-14]	1.77[-14]	3.80[-14]	5.65[-14]	7.19[-14]	2.10[-13]
0.6275	9.38[-15]	4.58[-14]	5.58[-14]	1.40[-14]	3.54[-14]	5.43[-14]	6.10[-14]	1.60[-13]
0.8157	9.72[-15]	5.04[-14]	5.46[-14]	1.14[-14]	3.33[-14]	5.17[-14]	5.19[-14]	1.22[-13]
1.0604	1.08[-14]	5.41[-14]	5.52[-14]	9.87[-15]	3.13[-14]	4.86[-14]	4.54[-14]	9.55[-14]
1.3786	1.27[-14]	5.68[-14]	5.74[-14]	9.06[-15]	2.93[-14]	4.52[-14]	4.14[-14]	7.81[-14]
1.7922	1.48[-14]	5.81[-14]	5.95[-14]	8.60[-15]	2.70[-14]	4.14[-14]	3.90[-14]	6.69[-14]
2.3298	1.63[-14]	5.69[-14]	5.96[-14]	8.09[-15]	2.44[-14]	3.71[-14]	3.70[-14]	5.86[-14]
3.0287	1.68[-14]	5.30[-14]	5.66[-14]	7.36[-15]	2.14[-14]	3.22[-14]	3.43[-14]	5.10[-14]
3.9374	1.59[-14]	4.68[-14]	5.07[-14]	6.40[-15]	1.81[-14]	2.70[-14]	3.05[-14]	4.33[-14]
5.1186	1.41[-14]	3.94[-14]	4.30[-14]	5.32[-15]	1.48[-14]	2.18[-14]	2.60[-14]	3.56[-14]
6.6542	1.19[-14]	3.17[-14]	3.49[-14]	4.24[-15]	1.17[-14]	1.71[-14]	2.11[-14]	2.82[-14]
8.6504	9.50[-15]	2.46[-14]	2.72[-14]	3.27[-15]	8.92[-15]	1.30[-14]	1.66[-14]	2.17[-14]

$T_e$ eV	$2s2p4d (^3P)$				$2s2p4d (^3P)$			
	$^4F_{3/2}$	$^4F_{5/2}$	$^4F_{7/2}$	$^4F_{9/2}$	$^4D_{1/2}$	$^4D_{3/2}$	$^4D_{5/2}$	$^4D_{7/2}$
11.2455	7.32[-15]	1.85[-14]	2.05[-14]	2.45[-15]	6.65[-15]	9.62[-15]	1.26[-14]	1.63[-14]
14.6192	5.48[-15]	1.36[-14]	1.51[-14]	1.79[-15]	4.86[-15]	6.99[-15]	9.34[-15]	1.19[-14]
19.0049	4.01[-15]	9.84[-15]	1.09[-14]	1.29[-15]	3.49[-15]	5.00[-15]	6.77[-15]	8.57[-15]
24.7064	2.88[-15]	7.00[-15]	7.78[-15]	9.12[-16]	2.47[-15]	3.53[-15]	4.84[-15]	6.08[-15]
32.1184	2.04[-15]	4.91[-15]	5.47[-15]	6.39[-16]	1.73[-15]	2.47[-15]	3.41[-15]	4.26[-15]
41.7539	1.43[-15]	3.42[-15]	3.81[-15]	4.44[-16]	1.20[-15]	1.71[-15]	2.38[-15]	2.97[-15]
54.2800	9.90[-16]	2.36[-15]	2.63[-15]	3.07[-16]	8.28[-16]	1.18[-15]	1.65[-15]	2.05[-15]
70.5640	6.83[-16]	1.63[-15]	1.81[-15]	2.10[-16]	5.69[-16]	8.09[-16]	1.14[-15]	1.41[-15]
91.7332	4.69[-16]	1.11[-15]	1.24[-15]	1.44[-16]	3.89[-16]	5.53[-16]	7.78[-16]	9.63[-16]
119.2532	3.20[-16]	7.59[-16]	8.46[-16]	9.81[-17]	2.65[-16]	3.77[-16]	5.31[-16]	6.56[-16]
$T_e$ eV	$2s2p4d (^3P)$		$2s2p4d (^3P)$		$2s2p4d (^3P)$		$2s2p5s (^3P)$	
	$^2F_{5/2}$	$^2F_{7/2}$	$^2D_{3/2}$	$^2D_{5/2}$	$^2P_{1/2}$	$^2P_{3/2}$	$^4P_{1/2}$	$^4P_{3/2}$
0.1000	3.28[-16]	3.59[-16]	2.18[-15]	2.41[-15]	4.52[-16]	9.46[-16]	6.42[-17]	2.83[-16]
0.1300	1.82[-15]	1.85[-15]	6.43[-15]	6.43[-15]	1.44[-15]	2.91[-15]	1.64[-16]	7.68[-16]
0.1690	6.80[-15]	7.19[-15]	1.46[-14]	1.36[-14]	4.24[-15]	8.39[-15]	3.44[-16]	1.69[-15]
0.2197	1.91[-14]	2.10[-14]	2.68[-14]	2.42[-14]	1.10[-14]	2.18[-14]	5.87[-16]	2.98[-15]
0.2856	4.27[-14]	4.85[-14]	4.11[-14]	3.71[-14]	2.38[-14]	4.74[-14]	8.30[-16]	4.31[-15]
0.3713	7.77[-14]	9.03[-14]	5.46[-14]	5.06[-14]	4.20[-14]	8.37[-14]	1.00[-15]	5.31[-15]
0.4827	1.17[-13]	1.39[-13]	6.48[-14]	6.21[-14]	6.12[-14]	1.22[-13]	1.09[-15]	5.76[-15]
0.6275	1.52[-13]	1.82[-13]	7.02[-14]	6.99[-14]	7.62[-14]	1.52[-13]	1.11[-15]	5.73[-15]
0.8157	1.73[-13]	2.09[-13]	7.12[-14]	7.35[-14]	8.37[-14]	1.66[-13]	1.14[-15]	5.49[-15]
1.0604	1.79[-13]	2.18[-13]	6.91[-14]	7.40[-14]	8.39[-14]	1.67[-13]	1.25[-15]	5.29[-15]
1.3786	1.73[-13]	2.12[-13]	6.54[-14]	7.27[-14]	7.86[-14]	1.56[-13]	1.43[-15]	5.21[-15]
1.7922	1.59[-13]	1.97[-13]	6.08[-14]	7.00[-14]	7.04[-14]	1.39[-13]	1.63[-15]	5.20[-15]
2.3298	1.41[-13]	1.75[-13]	5.52[-14]	6.57[-14]	6.07[-14]	1.20[-13]	1.77[-15]	5.11[-15]
3.0287	1.20[-13]	1.50[-13]	4.86[-14]	5.94[-14]	5.07[-14]	1.00[-13]	1.79[-15]	4.83[-15]
3.9374	9.91[-14]	1.25[-13]	4.13[-14]	5.17[-14]	4.12[-14]	8.15[-14]	1.69[-15]	4.35[-15]
5.1186	7.93[-14]	1.00[-13]	3.38[-14]	4.31[-14]	3.25[-14]	6.42[-14]	1.49[-15]	3.73[-15]
6.6542	6.18[-14]	7.87[-14]	2.67[-14]	3.45[-14]	2.49[-14]	4.93[-14]	1.25[-15]	3.06[-15]
8.6504	4.69[-14]	6.02[-14]	2.05[-14]	2.68[-14]	1.87[-14]	3.70[-14]	9.95[-16]	2.41[-15]
11.2455	3.49[-14]	4.50[-14]	1.53[-14]	2.02[-14]	1.37[-14]	2.72[-14]	7.67[-16]	1.84[-15]
14.6192	2.55[-14]	3.31[-14]	1.12[-14]	1.48[-14]	9.93[-15]	1.96[-14]	5.74[-16]	1.37[-15]
19.0049	1.84[-14]	2.39[-14]	8.07[-15]	1.07[-14]	7.07[-15]	1.40[-14]	4.20[-16]	9.97[-16]
24.7064	1.30[-14]	1.70[-14]	5.72[-15]	7.63[-15]	4.98[-15]	9.83[-15]	3.01[-16]	7.14[-16]
32.1184	9.16[-15]	1.20[-14]	4.02[-15]	5.36[-15]	3.47[-15]	6.85[-15]	2.13[-16]	5.05[-16]
41.7539	6.39[-15]	8.40[-15]	2.79[-15]	3.74[-15]	2.40[-15]	4.75[-15]	1.49[-16]	3.53[-16]
54.2800	4.42[-15]	5.82[-15]	1.93[-15]	2.58[-15]	1.65[-15]	3.27[-15]	1.04[-16]	2.45[-16]
70.5640	3.04[-15]	4.01[-15]	1.32[-15]	1.78[-15]	1.13[-15]	2.24[-15]	7.16[-17]	1.69[-16]
91.7332	2.08[-15]	2.75[-15]	9.06[-16]	1.22[-15]	7.74[-16]	1.53[-15]	4.91[-17]	1.16[-16]
119.2532	1.42[-15]	1.88[-15]	6.18[-16]	8.30[-16]	5.27[-16]	1.04[-15]	3.36[-17]	7.92[-17]
$T_e$ eV	$2p^23p (^3P)$			$2p^23p (^3P)$			$2p^23p (^3P)$	
	$^2S_{1/2}$	$^4D_{1/2}$	$^4D_{3/2}$	$^4D_{5/2}$	$^4D_{7/2}$	$^4P_{1/2}$	$^4P_{3/2}$	$^4P_{5/2}$
0.1000	2.57[-15]	2.32[-14]	2.47[-14]	4.21[-14]	1.46[-13]	7.94[-16]	3.67[-15]	1.30[-15]
0.1300	6.00[-15]	1.95[-14]	2.14[-14]	3.76[-14]	1.33[-13]	1.46[-15]	6.95[-15]	2.74[-15]
0.1690	1.09[-14]	1.57[-14]	1.79[-14]	3.22[-14]	1.13[-13]	2.25[-15]	1.09[-14]	4.86[-15]
0.2197	1.63[-14]	1.24[-14]	1.48[-14]	2.67[-14]	9.20[-14]	2.99[-15]	1.48[-14]	7.37[-15]
0.2856	2.10[-14]	9.80[-15]	1.23[-14]	2.19[-14]	7.18[-14]	3.52[-15]	1.77[-14]	9.66[-15]
0.3713	2.37[-14]	8.09[-15]	1.06[-14]	1.77[-14]	5.45[-14]	3.75[-15]	1.91[-14]	1.12[-14]
0.4827	2.42[-14]	7.14[-15]	9.66[-15]	1.43[-14]	4.06[-14]	3.67[-15]	1.89[-14]	1.16[-14]
0.6275	2.26[-14]	6.65[-15]	9.13[-15]	1.15[-14]	2.98[-14]	3.36[-15]	1.73[-14]	1.10[-14]
0.8157	1.97[-14]	6.31[-15]	8.70[-15]	9.36[-15]	2.19[-14]	2.91[-15]	1.51[-14]	9.81[-15]
1.0604	1.64[-14]	5.96[-15]	8.23[-15]	7.84[-15]	1.65[-14]	2.44[-15]	1.26[-14]	8.35[-15]
1.3786	1.31[-14]	5.55[-15]	7.66[-15]	6.86[-15]	1.29[-14]	2.00[-15]	1.02[-14]	6.93[-15]

$T_e$ eV	$2p^23p$ ( $^3P$ )			$2p^23p$ ( $^3P$ )			$2p^23p$ ( $^3P$ )		
	$^2S_{1/2}$	$^4D_{1/2}$	$^4D_{3/2}$	$^4D_{5/2}$	$^4D_{7/2}$	$^4P_{1/2}$	$^4P_{3/2}$	$^4P_{5/2}$	
1.7922	1.01[-14]	5.08[-15]	7.02[-15]	6.25[-15]	1.07[-14]	1.64[-15]	8.20[-15]	5.71[-15]	
2.3298	7.69[-15]	4.59[-15]	6.32[-15]	5.78[-15]	9.08[-15]	1.36[-15]	6.57[-15]	4.69[-15]	
3.0287	5.73[-15]	4.09[-15]	5.58[-15]	5.26[-15]	7.77[-15]	1.12[-15]	5.26[-15]	3.83[-15]	
3.9374	4.21[-15]	3.57[-15]	4.82[-15]	4.64[-15]	6.55[-15]	9.24[-16]	4.20[-15]	3.10[-15]	
5.1186	3.05[-15]	3.04[-15]	4.04[-15]	3.92[-15]	5.38[-15]	7.49[-16]	3.32[-15]	2.46[-15]	
6.6542	2.18[-15]	2.50[-15]	3.28[-15]	3.19[-15]	4.28[-15]	5.94[-16]	2.59[-15]	1.91[-15]	
8.6504	1.55[-15]	2.00[-15]	2.59[-15]	2.50[-15]	3.30[-15]	4.60[-16]	1.98[-15]	1.45[-15]	
11.2455	1.09[-15]	1.55[-15]	1.99[-15]	1.90[-15]	2.49[-15]	3.48[-16]	1.48[-15]	1.08[-15]	
14.6192	7.56[-16]	1.17[-15]	1.49[-15]	1.41[-15]	1.83[-15]	2.57[-16]	1.09[-15]	7.87[-16]	
19.0049	5.24[-16]	8.61[-16]	1.09[-15]	1.02[-15]	1.32[-15]	1.87[-16]	7.90[-16]	5.65[-16]	
24.7064	3.61[-16]	6.23[-16]	7.84[-16]	7.30[-16]	9.41[-16]	1.34[-16]	5.64[-16]	4.00[-16]	
32.1184	2.47[-16]	4.44[-16]	5.57[-16]	5.15[-16]	6.62[-16]	9.46[-17]	3.98[-16]	2.81[-16]	
41.7539	1.69[-16]	3.13[-16]	3.91[-16]	3.60[-16]	4.61[-16]	6.62[-17]	2.78[-16]	1.95[-16]	
54.2800	1.15[-16]	2.18[-16]	2.72[-16]	2.49[-16]	3.19[-16]	4.59[-17]	1.93[-16]	1.35[-16]	
70.5640	7.83[-17]	1.51[-16]	1.88[-16]	1.72[-16]	2.20[-16]	3.17[-17]	1.33[-16]	9.27[-17]	
91.7332	5.31[-17]	1.04[-16]	1.29[-16]	1.18[-16]	1.50[-16]	2.17[-17]	9.11[-17]	6.34[-17]	
119.2532	3.60[-17]	7.14[-17]	8.86[-17]	8.03[-17]	1.03[-16]	1.49[-17]	6.22[-17]	4.33[-17]	

Table XI: DR rate coefficients ( $\alpha_d$  in  $\text{cm}^3/\text{s}$ ) for excited even-parity states of B-like oxygen.

$T_e$ eV	$2s2p^2$ ( $^3P$ )			$2s2p^2$ ( $^2D$ )		$2s2p^2$ ( $^1S$ )	$2s2p^2$ ( $^3P$ )	
	$^4P_{1/2}$	$^4P_{3/2}$	$^4P_{5/2}$	$^2D_{3/2}$	$^2D_{5/2}$	$^2S_{1/2}$	$^2P_{1/2}$	$^2P_{3/2}$
0.1000	2.48[-15]	2.34[-15]	1.66[-15]	2.43[-12]	3.32[-12]	1.73[-12]	1.22[-12]	2.03[-12]
0.1300	3.41[-15]	7.14[-15]	9.57[-15]	4.10[-12]	5.73[-12]	1.87[-12]	1.29[-12]	2.23[-12]
0.1690	7.36[-15]	3.47[-14]	5.75[-14]	5.65[-12]	8.01[-12]	1.82[-12]	1.23[-12]	2.20[-12]
0.2197	2.05[-14]	1.27[-13]	2.24[-13]	6.67[-12]	9.59[-12]	1.64[-12]	1.09[-12]	2.04[-12]
0.2856	4.87[-14]	3.24[-13]	5.86[-13]	7.08[-12]	1.04[-11]	1.43[-12]	9.32[-13]	1.85[-12]
0.3713	8.99[-14]	6.11[-13]	1.13[-12]	7.05[-12]	1.05[-11]	1.26[-12]	7.87[-13]	1.72[-12]
0.4827	1.33[-13]	9.11[-13]	1.70[-12]	6.77[-12]	1.03[-11]	1.17[-12]	6.73[-13]	1.65[-12]
0.6275	1.66[-13]	1.13[-12]	2.15[-12]	6.32[-12]	9.88[-12]	1.13[-12]	5.87[-13]	1.59[-12]
0.8157	1.82[-13]	1.24[-12]	2.37[-12]	5.76[-12]	9.16[-12]	1.11[-12]	5.22[-13]	1.54[-12]
1.0604	1.82[-13]	1.22[-12]	2.38[-12]	5.11[-12]	8.24[-12]	1.09[-12]	4.75[-13]	1.49[-12]
1.3786	1.72[-13]	1.13[-12]	2.24[-12]	4.45[-12]	7.23[-12]	1.09[-12]	4.44[-13]	1.46[-12]
1.7922	1.57[-13]	1.00[-12]	2.02[-12]	3.82[-12]	6.24[-12]	1.08[-12]	4.23[-13]	1.46[-12]
2.3298	1.40[-13]	8.59[-13]	1.77[-12]	3.24[-12]	5.30[-12]	1.05[-12]	4.04[-13]	1.44[-12]
3.0287	1.23[-13]	7.18[-13]	1.51[-12]	2.71[-12]	4.44[-12]	9.99[-13]	3.80[-13]	1.38[-12]
3.9374	1.05[-13]	5.84[-13]	1.24[-12]	2.23[-12]	3.64[-12]	9.09[-13]	3.46[-13]	1.27[-12]
5.1186	8.67[-14]	4.63[-13]	9.97[-13]	1.79[-12]	2.92[-12]	7.91[-13]	3.03[-13]	1.11[-12]
6.6542	6.94[-14]	3.58[-13]	7.76[-13]	1.41[-12]	2.29[-12]	6.59[-13]	2.55[-13]	9.24[-13]
8.6504	5.39[-14]	2.69[-13]	5.88[-13]	1.08[-12]	1.75[-12]	5.29[-13]	2.06[-13]	7.42[-13]
11.2455	4.08[-14]	1.99[-13]	4.36[-13]	8.14[-13]	1.32[-12]	4.10[-13]	1.62[-13]	5.75[-13]
14.6192	3.01[-14]	1.44[-13]	3.17[-13]	6.01[-13]	9.69[-13]	3.09[-13]	1.23[-13]	4.34[-13]
19.0049	2.18[-14]	1.03[-13]	2.27[-13]	4.36[-13]	7.01[-13]	2.28[-13]	9.16[-14]	3.20[-13]
24.7064	1.56[-14]	7.25[-14]	1.60[-13]	3.12[-13]	5.01[-13]	1.65[-13]	6.67[-14]	2.31[-13]
32.1184	1.10[-14]	5.07[-14]	1.12[-13]	2.20[-13]	3.53[-13]	1.18[-13]	4.78[-14]	1.65[-13]
41.7539	7.65[-15]	3.51[-14]	7.77[-14]	1.54[-13]	2.47[-13]	8.29[-14]	3.38[-14]	1.16[-13]
54.2800	5.30[-15]	2.42[-14]	5.36[-14]	1.07[-13]	1.71[-13]	5.78[-14]	2.37[-14]	8.08[-14]
70.5640	3.65[-15]	1.66[-14]	3.68[-14]	7.37[-14]	1.18[-13]	4.01[-14]	1.65[-14]	5.59[-14]
91.7332	2.50[-15]	1.13[-14]	2.51[-14]	5.06[-14]	8.10[-14]	2.76[-14]	1.13[-14]	3.85[-14]
119.2532	1.71[-15]	7.72[-15]	1.71[-14]	3.46[-14]	5.54[-14]	1.89[-14]	7.79[-15]	2.64[-14]
$T_e$ eV	$2s2p3p$ ( $^3P$ )			$2s2p3p$ ( $^3P$ )		$2s2p3p$ ( $^3P$ )		
	$^4D_{1/2}$	$^4D_{3/2}$	$^4D_{5/2}$	$^4D_{7/2}$	$^2P_{1/2}$	$^2P_{3/2}$	$^2D_{3/2}$	$^2D_{5/2}$
0.1000	2.42[-14]	2.33[-14]	9.78[-16]	1.54[-16]	1.67[-13]	3.10[-13]	3.18[-13]	3.79[-13]
0.1300	2.55[-14]	2.68[-14]	3.71[-15]	6.36[-16]	1.76[-13]	3.41[-13]	3.38[-13]	4.31[-13]
0.1690	2.44[-14]	3.35[-14]	1.70[-14]	2.87[-15]	1.68[-13]	3.37[-13]	3.27[-13]	4.38[-13]
0.2197	2.18[-14]	5.19[-14]	5.59[-14]	9.74[-15]	1.50[-13]	3.13[-13]	3.00[-13]	4.17[-13]
0.2856	1.89[-14]	8.80[-14]	1.30[-13]	2.36[-14]	1.29[-13]	2.87[-13]	2.75[-13]	3.95[-13]
0.3713	1.66[-14]	1.37[-13]	2.29[-13]	4.30[-14]	1.11[-13]	2.71[-13]	2.69[-13]	3.95[-13]
0.4827	1.51[-14]	1.83[-13]	3.24[-13]	6.27[-14]	9.86[-14]	2.65[-13]	2.82[-13]	4.22[-13]
0.6275	1.41[-14]	2.13[-13]	3.87[-13]	7.68[-14]	8.94[-14]	2.60[-13]	3.02[-13]	4.56[-13]
0.8157	1.32[-14]	2.23[-13]	4.09[-13]	8.26[-14]	8.12[-14]	2.50[-13]	3.13[-13]	4.78[-13]
1.0604	1.25[-14]	2.14[-13]	3.95[-13]	8.09[-14]	7.28[-14]	2.33[-13]	3.10[-13]	4.76[-13]
1.3786	1.17[-14]	1.93[-13]	3.59[-13]	7.42[-14]	6.41[-14]	2.10[-13]	2.94[-13]	4.54[-13]
1.7922	1.09[-14]	1.67[-13]	3.11[-13]	6.49[-14]	5.52[-14]	1.83[-13]	2.68[-13]	4.17[-13]
2.3298	1.01[-14]	1.40[-13]	2.59[-13]	5.50[-14]	4.67[-14]	1.56[-13]	2.37[-13]	3.70[-13]
3.0287	9.03[-15]	1.14[-13]	2.10[-13]	4.52[-14]	3.85[-14]	1.29[-13]	2.03[-13]	3.17[-13]
3.9374	7.81[-15]	9.00[-14]	1.65[-13]	3.62[-14]	3.10[-14]	1.04[-13]	1.68[-13]	2.64[-13]
5.1186	6.50[-15]	6.93[-14]	1.27[-13]	2.82[-14]	2.44[-14]	8.16[-14]	1.35[-13]	2.12[-13]
6.6542	5.21[-15]	5.22[-14]	9.53[-14]	2.14[-14]	1.87[-14]	6.23[-14]	1.05[-13]	1.66[-13]
8.6504	4.04[-15]	3.84[-14]	7.01[-14]	1.59[-14]	1.40[-14]	4.65[-14]	7.98[-14]	1.26[-13]
11.2455	3.04[-15]	2.78[-14]	5.07[-14]	1.16[-14]	1.03[-14]	3.41[-14]	5.92[-14]	9.33[-14]
14.6192	2.24[-15]	1.99[-14]	3.61[-14]	8.36[-15]	7.40[-15]	2.45[-14]	4.31[-14]	6.79[-14]
19.0049	1.62[-15]	1.40[-14]	2.54[-14]	5.93[-15]	5.26[-15]	1.74[-14]	3.08[-14]	4.87[-14]
24.7064	1.15[-15]	9.80[-15]	1.77[-14]	4.16[-15]	3.70[-15]	1.22[-14]	2.18[-14]	3.44[-14]
32.1184	8.12[-16]	6.79[-15]	1.23[-14]	2.89[-15]	2.58[-15]	8.52[-15]	1.53[-14]	2.41[-14]

$T_e$ eV	$2s2p3p$ ( $^3P$ )				$2s2p3p$ ( $^3P$ )		$2s2p3p$ ( $^3P$ )							
	$^4D_{1/2}$	$^4D_{3/2}$	$^4D_{5/2}$	$^4D_{7/2}$	$^2P_{1/2}$	$^2P_{3/2}$	$^2D_{3/2}$	$^2D_{5/2}$						
41.7539	5.66[-16]	4.68[-15]	8.46[-15]	2.00[-15]	1.79[-15]	5.89[-15]	1.06[-14]	1.67[-14]						
54.2800	3.91[-16]	3.21[-15]	5.80[-15]	1.37[-15]	1.23[-15]	4.05[-15]	7.30[-15]	1.15[-14]						
70.5640	2.69[-16]	2.19[-15]	3.96[-15]	9.40[-16]	8.42[-16]	2.77[-15]	5.01[-15]	7.91[-15]						
91.7332	1.84[-16]	1.49[-15]	2.70[-15]	6.41[-16]	5.75[-16]	1.89[-15]	3.43[-15]	5.41[-15]						
119.2532	1.26[-16]	1.02[-15]	1.83[-15]	4.36[-16]	3.91[-16]	1.29[-15]	2.34[-15]	3.69[-15]						
$T_e$ eV	$2s2p3p$ ( $^3P$ )			$2s2p3p$ ( $^1P$ )		$2s2p3p$ ( $^1P$ )								
	$^4P_{1/2}$	$^4P_{3/2}$	$^4P_{5/2}$	$^2D_{3/2}$	$^2D_{5/2}$	$^2P_{1/2}$	$^2P_{3/2}$	$^2S_{1/2}$						
0.1000	1.82[-16]	2.92[-16]	3.20[-16]	2.96[-13]	4.15[-13]	8.65[-14]	1.45[-13]	3.14[-14]						
0.1300	2.53[-16]	6.54[-16]	9.37[-16]	5.10[-13]	7.26[-13]	9.13[-14]	1.59[-13]	3.40[-14]						
0.1690	5.52[-16]	2.69[-15]	4.54[-15]	7.06[-13]	1.02[-12]	8.71[-14]	1.57[-13]	3.32[-14]						
0.2197	1.55[-15]	9.55[-15]	1.70[-14]	8.30[-13]	1.21[-12]	7.76[-14]	1.44[-13]	3.07[-14]						
0.2856	3.67[-15]	2.42[-14]	4.43[-14]	8.63[-13]	1.27[-12]	6.71[-14]	1.29[-13]	3.01[-14]						
0.3713	6.80[-15]	4.55[-14]	8.50[-14]	8.21[-13]	1.21[-12]	5.95[-14]	1.18[-13]	3.52[-14]						
0.4827	1.02[-14]	6.78[-14]	1.29[-13]	7.33[-13]	1.09[-12]	5.58[-14]	1.15[-13]	4.72[-14]						
0.6275	1.29[-14]	8.47[-14]	1.62[-13]	6.27[-13]	9.38[-13]	5.48[-14]	1.17[-13]	6.27[-14]						
0.8157	1.45[-14]	9.27[-14]	1.80[-13]	5.23[-13]	7.85[-13]	5.44[-14]	1.19[-13]	7.66[-14]						
1.0604	1.52[-14]	9.26[-14]	1.81[-13]	4.30[-13]	6.50[-13]	5.34[-14]	1.21[-13]	8.54[-14]						
1.3786	1.53[-14]	8.71[-14]	1.73[-13]	3.56[-13]	5.40[-13]	5.19[-14]	1.23[-13]	8.88[-14]						
1.7922	1.51[-14]	7.91[-14]	1.60[-13]	2.98[-13]	4.56[-13]	5.01[-14]	1.25[-13]	8.79[-14]						
2.3298	1.46[-14]	6.99[-14]	1.43[-13]	2.53[-13]	3.91[-13]	4.79[-14]	1.26[-13]	8.38[-14]						
3.0287	1.37[-14]	6.03[-14]	1.25[-13]	2.17[-13]	3.38[-13]	4.50[-14]	1.23[-13]	7.76[-14]						
3.9374	1.23[-14]	5.06[-14]	1.05[-13]	1.85[-13]	2.89[-13]	4.10[-14]	1.14[-13]	6.98[-14]						
5.1186	1.06[-14]	4.11[-14]	8.62[-14]	1.55[-13]	2.44[-13]	3.60[-14]	1.01[-13]	6.08[-14]						
6.6542	8.69[-15]	3.24[-14]	6.82[-14]	1.27[-13]	2.00[-13]	3.04[-14]	8.56[-14]	5.14[-14]						
8.6504	6.89[-15]	2.49[-14]	5.24[-14]	1.02[-13]	1.60[-13]	2.47[-14]	6.95[-14]	4.20[-14]						
11.2455	5.28[-15]	1.86[-14]	3.92[-14]	7.91[-14]	1.24[-13]	1.94[-14]	5.44[-14]	3.33[-14]						
14.6192	3.94[-15]	1.36[-14]	2.87[-14]	5.99[-14]	9.39[-14]	1.48[-14]	4.13[-14]	2.56[-14]						
19.0049	2.88[-15]	9.79[-15]	2.07[-14]	4.44[-14]	6.96[-14]	1.10[-14]	3.06[-14]	1.93[-14]						
24.7064	2.06[-15]	6.95[-15]	1.47[-14]	3.23[-14]	5.06[-14]	8.03[-15]	2.22[-14]	1.42[-14]						
32.1184	1.46[-15]	4.87[-15]	1.03[-14]	2.31[-14]	3.62[-14]	5.76[-15]	1.59[-14]	1.02[-14]						
41.7539	1.02[-15]	3.39[-15]	7.16[-15]	1.64[-14]	2.56[-14]	4.07[-15]	1.12[-14]	7.28[-15]						
54.2800	7.10[-16]	2.34[-15]	4.95[-15]	1.14[-14]	1.79[-14]	2.85[-15]	7.82[-15]	5.12[-15]						
70.5640	4.90[-16]	1.61[-15]	3.40[-15]	7.95[-15]	1.24[-14]	1.98[-15]	5.42[-15]	3.57[-15]						
91.7332	3.36[-16]	1.10[-15]	2.33[-15]	5.48[-15]	8.57[-15]	1.37[-15]	3.74[-15]	2.47[-15]						
119.2532	2.30[-16]	7.51[-16]	1.59[-15]	3.76[-15]	5.88[-15]	9.37[-16]	2.56[-15]	1.70[-15]						
$T_e$ eV	$2s^23s$ ( $^1S$ )		$2s^24s$ ( $^1S$ )		$2s^25s$ ( $^1S$ )		$2s^26s$ ( $^1S$ )		$2s^27s$ ( $^1S$ )		$2s^28s$ ( $^1S$ )		$2s2p3p$ ( $^3P$ )	
	$^2S_{1/2}$	$^2S_{1/2}$	$^2S_{1/2}$	$^2S_{1/2}$	$^2S_{1/2}$	$^2S_{1/2}$	$^2S_{1/2}$	$^2S_{1/2}$	$^2S_{1/2}$	$^2S_{1/2}$	$^4S_{3/2}$	$^2S_{1/2}$	$^4S_{3/2}$	$^2S_{1/2}$
0.1000	2.40[-14]	1.31[-13]	2.16[-16]	1.23[-14]	2.41[-14]	1.22[-16]	1.99[-15]	7.55[-13]						
0.1300	2.60[-14]	1.41[-13]	2.34[-16]	1.34[-14]	2.61[-14]	1.36[-16]	2.34[-15]	8.17[-13]						
0.1690	2.53[-14]	1.38[-13]	2.55[-16]	1.30[-14]	2.54[-14]	1.39[-16]	3.28[-15]	7.94[-13]						
0.2197	2.26[-14]	1.26[-13]	4.39[-16]	1.16[-14]	2.27[-14]	1.50[-16]	6.58[-15]	7.10[-13]						
0.2856	1.93[-14]	1.19[-13]	1.23[-15]	9.76[-15]	1.91[-14]	2.04[-16]	1.41[-14]	5.99[-13]						
0.3713	1.61[-14]	1.29[-13]	3.21[-15]	7.88[-15]	1.53[-14]	3.36[-16]	2.57[-14]	4.87[-13]						
0.4827	1.38[-14]	1.62[-13]	6.47[-15]	6.22[-15]	1.19[-14]	5.34[-16]	3.84[-14]	3.90[-13]						
0.6275	1.21[-14]	2.13[-13]	1.03[-14]	4.88[-15]	9.04[-15]	7.50[-16]	4.86[-14]	3.14[-13]						
0.8157	1.09[-14]	2.66[-13]	1.38[-14]	3.85[-15]	6.84[-15]	9.30[-16]	5.44[-14]	2.60[-13]						
1.0604	9.81[-15]	3.03[-13]	1.64[-14]	3.07[-15]	5.19[-15]	1.06[-15]	5.59[-14]	2.23[-13]						
1.3786	8.71[-15]	3.17[-13]	1.90[-14]	2.59[-15]	4.00[-15]	1.15[-15]	5.43[-14]	1.96[-13]						
1.7922	7.60[-15]	3.05[-13]	2.33[-14]	2.76[-15]	3.18[-15]	1.24[-15]	5.06[-14]	1.75[-13]						
2.3298	6.52[-15]	2.74[-13]	3.03[-14]	4.24[-15]	2.69[-15]	1.40[-15]	4.57[-14]	1.55[-13]						
3.0287	5.52[-15]	2.32[-13]	3.87[-14]	7.48[-15]	2.56[-15]	1.76[-15]	3.98[-14]	1.35[-13]						
3.9374	4.61[-15]	1.87[-13]	4.59[-14]	1.19[-14]	2.76[-15]	2.40[-15]	3.34[-14]	1.13[-13]						
5.1186	3.81[-15]	1.46[-13]	4.94[-14]	1.62[-14]	3.14[-15]	3.19[-15]	2.71[-14]	9.21[-14]						

$T_e$ eV	$2s^23s ({}^1S)$ ${}^2S_{1/2}$	$2s^24s ({}^1S)$ ${}^2S_{1/2}$	$2s^25s ({}^1S)$ ${}^2S_{1/2}$	$2s^26s ({}^1S)$ ${}^2S_{1/2}$	$2s^27s ({}^1S)$ ${}^2S_{1/2}$	$2s^28s ({}^1S)$ ${}^2S_{1/2}$	$2s2p3p ({}^3P)$ ${}^4S_{3/2}$ ${}^2S_{1/2}$	
6.6542	3.10[-15]	1.10[-13]	4.84[-14]	1.90[-14]	3.45[-15]	3.88[-15]	2.13[-14]	7.26[-14]
8.6504	2.49[-15]	8.11[-14]	4.39[-14]	1.97[-14]	3.53[-15]	4.24[-15]	1.62[-14]	5.55[-14]
11.2455	1.96[-15]	5.86[-14]	3.73[-14]	1.86[-14]	3.34[-15]	4.21[-15]	1.21[-14]	4.14[-14]
14.6192	1.51[-15]	4.17[-14]	3.01[-14]	1.62[-14]	2.96[-15]	3.84[-15]	8.79[-15]	3.03[-14]
19.0049	1.14[-15]	2.93[-14]	2.34[-14]	1.33[-14]	2.47[-15]	3.28[-15]	6.30[-15]	2.18[-14]
24.7064	8.44[-16]	2.04[-14]	1.76[-14]	1.05[-14]	1.96[-15]	2.66[-15]	4.46[-15]	1.54[-14]
32.1184	6.13[-16]	1.41[-14]	1.29[-14]	7.94[-15]	1.51[-15]	2.07[-15]	3.12[-15]	1.08[-14]
41.7539	4.39[-16]	9.73[-15]	9.26[-15]	5.86[-15]	1.12[-15]	1.56[-15]	2.16[-15]	7.52[-15]
54.2800	3.10[-16]	6.66[-15]	6.57[-15]	4.24[-15]	8.19[-16]	1.14[-15]	1.49[-15]	5.19[-15]
70.5640	2.17[-16]	4.55[-15]	4.60[-15]	3.02[-15]	5.86[-16]	8.22[-16]	1.02[-15]	3.57[-15]
91.7332	1.51[-16]	3.09[-15]	3.20[-15]	2.12[-15]	4.14[-16]	5.83[-16]	7.01[-16]	2.44[-15]
119.2532	1.04[-16]	2.10[-15]	2.21[-15]	1.48[-15]	2.89[-16]	4.09[-16]	4.77[-16]	1.66[-15]
$T_e$ eV	$2s^23d ({}^1S)$ ${}^2D_{3/2}$ ${}^2D_{5/2}$		$2s^24d ({}^1S)$ ${}^2D_{3/2}$ ${}^2D_{5/2}$		$2s^25d ({}^1S)$ ${}^2D_{3/2}$ ${}^2D_{5/2}$		$2s^26d ({}^1S)$ ${}^2D_{3/2}$ ${}^2D_{5/2}$	
0.1000	6.42[-14]	8.96[-14]	8.36[-15]	1.01[-14]	1.84[-15]	2.14[-15]	2.15[-15]	8.31[-16]
0.1300	1.09[-13]	1.55[-13]	1.00[-14]	1.29[-14]	1.99[-15]	2.47[-15]	2.40[-15]	9.28[-16]
0.1690	1.50[-13]	2.16[-13]	1.09[-14]	1.48[-14]	1.96[-15]	2.56[-15]	2.39[-15]	9.23[-16]
0.2197	1.76[-13]	2.56[-13]	1.09[-14]	1.53[-14]	1.79[-15]	2.43[-15]	2.20[-15]	8.43[-16]
0.2856	1.82[-13]	2.68[-13]	1.01[-14]	1.45[-14]	1.54[-15]	2.14[-15]	1.92[-15]	7.26[-16]
0.3713	1.71[-13]	2.54[-13]	8.82[-15]	1.29[-14]	1.27[-15]	1.80[-15]	1.66[-15]	6.07[-16]
0.4827	1.51[-13]	2.25[-13]	7.48[-15]	1.12[-14]	1.01[-15]	1.45[-15]	1.44[-15]	5.03[-16]
0.6275	1.26[-13]	1.89[-13]	7.27[-15]	1.17[-14]	7.85[-16]	1.15[-15]	1.26[-15]	4.22[-16]
0.8157	1.01[-13]	1.53[-13]	1.16[-14]	2.09[-14]	6.18[-16]	9.14[-16]	1.11[-15]	3.68[-16]
1.0604	7.83[-14]	1.20[-13]	2.58[-14]	4.92[-14]	6.01[-16]	9.02[-16]	1.00[-15]	3.59[-16]
1.3786	5.98[-14]	9.21[-14]	5.22[-14]	1.01[-13]	1.21[-15]	1.83[-15]	1.00[-15]	5.22[-16]
1.7922	4.52[-14]	6.99[-14]	8.60[-14]	1.68[-13]	3.61[-15]	5.43[-15]	1.50[-15]	1.44[-15]
2.3298	3.41[-14]	5.29[-14]	1.17[-13]	2.27[-13]	9.00[-15]	1.35[-14]	3.36[-15]	4.40[-15]
3.0287	2.59[-14]	4.03[-14]	1.35[-13]	2.64[-13]	1.71[-14]	2.57[-14]	7.35[-15]	1.06[-14]
3.9374	2.00[-14]	3.11[-14]	1.39[-13]	2.70[-13]	2.59[-14]	3.88[-14]	1.31[-14]	1.95[-14]
5.1186	1.59[-14]	2.46[-14]	1.29[-13]	2.52[-13]	3.26[-14]	4.88[-14]	1.91[-14]	2.86[-14]
6.6542	1.28[-14]	1.98[-14]	1.12[-13]	2.18[-13]	3.56[-14]	5.32[-14]	2.34[-14]	3.53[-14]
8.6504	1.03[-14]	1.59[-14]	9.18[-14]	1.78[-13]	3.47[-14]	5.20[-14]	2.51[-14]	3.79[-14]
11.2455	8.28[-15]	1.27[-14]	7.19[-14]	1.39[-13]	3.12[-14]	4.67[-14]	2.42[-14]	3.65[-14]
14.6192	6.51[-15]	9.97[-15]	5.45[-14]	1.05[-13]	2.62[-14]	3.92[-14]	2.14[-14]	3.24[-14]
19.0049	5.01[-15]	7.65[-15]	4.02[-14]	7.77[-14]	2.09[-14]	3.13[-14]	1.79[-14]	2.70[-14]
24.7064	3.76[-15]	5.74[-15]	2.90[-14]	5.61[-14]	1.61[-14]	2.41[-14]	1.42[-14]	2.15[-14]
32.1184	2.77[-15]	4.22[-15]	2.07[-14]	3.99[-14]	1.20[-14]	1.79[-14]	1.08[-14]	1.64[-14]
41.7539	2.01[-15]	3.05[-15]	1.45[-14]	2.80[-14]	8.73[-15]	1.31[-14]	8.06[-15]	1.22[-14]
54.2800	1.43[-15]	2.17[-15]	1.01[-14]	1.95[-14]	6.25[-15]	9.35[-15]	5.85[-15]	8.86[-15]
70.5640	1.01[-15]	1.53[-15]	6.99[-15]	1.35[-14]	4.41[-15]	6.60[-15]	4.18[-15]	6.33[-15]
91.7332	7.03[-16]	1.07[-15]	4.80[-15]	9.27[-15]	3.08[-15]	4.61[-15]	2.95[-15]	4.46[-15]
119.2532	4.87[-16]	7.40[-16]	3.29[-15]	6.34[-15]	2.14[-15]	3.20[-15]	2.06[-15]	3.11[-15]
$T_e$ eV	$2s^25g ({}^1S)$ ${}^2G_{7/2}$ ${}^2G_{9/2}$		$2s^26g ({}^1S)$ ${}^2G_{7/2}$ ${}^2G_{9/2}$		$2s^27g ({}^1S)$ ${}^2G_{7/2}$ ${}^2G_{9/2}$		$2s^28g ({}^1S)$ ${}^2G_{7/2}$ ${}^2G_{9/2}$	
0.1000	1.92[-17]	2.30[-17]	3.20[-17]	3.84[-17]	5.28[-17]	6.32[-17]	1.27[-16]	1.55[-16]
0.1300	3.31[-17]	4.03[-17]	5.51[-17]	6.72[-17]	9.08[-17]	1.11[-16]	2.19[-16]	2.71[-16]
0.1690	4.58[-17]	5.67[-17]	7.64[-17]	9.45[-17]	1.26[-16]	1.56[-16]	3.04[-16]	3.80[-16]
0.2197	5.40[-17]	6.75[-17]	8.99[-17]	1.12[-16]	1.48[-16]	1.85[-16]	3.58[-16]	4.52[-16]
0.2856	5.62[-17]	7.11[-17]	9.36[-17]	1.18[-16]	1.55[-16]	1.94[-16]	3.73[-16]	4.74[-16]
0.3713	5.37[-17]	6.88[-17]	8.91[-17]	1.14[-16]	1.48[-16]	1.87[-16]	3.55[-16]	4.54[-16]
0.4827	4.82[-17]	6.28[-17]	7.96[-17]	1.03[-16]	1.33[-16]	1.68[-16]	3.18[-16]	4.08[-16]
0.6275	4.18[-17]	5.55[-17]	6.79[-17]	8.91[-17]	1.15[-16]	1.45[-16]	2.73[-16]	3.51[-16]
0.8157	4.91[-17]	6.50[-17]	5.65[-17]	7.53[-17]	9.64[-17]	1.22[-16]	2.30[-16]	2.96[-16]



$T_e$ eV	$2s^25g (^1S)$		$2s^26g (^1S)$		$2s^27g (^1S)$		$2s^28g (^1S)$	
	$^2G_{7/2}$	$^2G_{9/2}$	$^2G_{7/2}$	$^2G_{9/2}$	$^2G_{7/2}$	$^2G_{9/2}$	$^2G_{7/2}$	$^2G_{9/2}$
1.0604	2.43[-16]	3.07[-16]	6.17[-17]	8.19[-17]	8.23[-17]	1.04[-16]	2.00[-16]	2.56[-16]
1.3786	1.57[-15]	1.97[-15]	2.50[-16]	3.16[-16]	1.01[-16]	1.28[-16]	2.14[-16]	2.73[-16]
1.7922	6.50[-15]	8.13[-15]	1.42[-15]	1.78[-15]	3.32[-16]	4.16[-16]	4.69[-16]	5.91[-16]
2.3298	1.78[-14]	2.23[-14]	5.41[-15]	6.76[-15]	1.32[-15]	1.66[-15]	1.68[-15]	2.11[-15]
3.0287	3.54[-14]	4.43[-14]	1.39[-14]	1.74[-14]	3.86[-15]	4.82[-15]	5.13[-15]	6.41[-15]
3.9374	5.48[-14]	6.85[-14]	2.64[-14]	3.30[-14]	8.15[-15]	1.02[-14]	1.15[-14]	1.44[-14]
5.1186	7.01[-14]	8.76[-14]	3.95[-14]	4.93[-14]	1.33[-14]	1.66[-14]	1.99[-14]	2.48[-14]
6.6542	7.74[-14]	9.67[-14]	4.91[-14]	6.13[-14]	1.77[-14]	2.21[-14]	2.77[-14]	3.46[-14]
8.6504	7.62[-14]	9.53[-14]	5.30[-14]	6.62[-14]	2.01[-14]	2.52[-14]	3.27[-14]	4.09[-14]
11.2455	6.88[-14]	8.60[-14]	5.13[-14]	6.41[-14]	2.03[-14]	2.54[-14]	3.40[-14]	4.24[-14]
14.6192	5.81[-14]	7.26[-14]	4.58[-14]	5.72[-14]	1.87[-14]	2.34[-14]	3.19[-14]	3.99[-14]
19.0049	4.66[-14]	5.82[-14]	3.82[-14]	4.78[-14]	1.60[-14]	2.00[-14]	2.78[-14]	3.47[-14]
24.7064	3.59[-14]	4.48[-14]	3.04[-14]	3.80[-14]	1.30[-14]	1.62[-14]	2.28[-14]	2.85[-14]
32.1184	2.68[-14]	3.35[-14]	2.33[-14]	2.91[-14]	1.01[-14]	1.26[-14]	1.79[-14]	2.24[-14]
41.7539	1.96[-14]	2.45[-14]	1.73[-14]	2.16[-14]	7.59[-15]	9.49[-15]	1.36[-14]	1.70[-14]
54.2800	1.40[-14]	1.75[-14]	1.26[-14]	1.57[-14]	5.57[-15]	6.96[-15]	1.00[-14]	1.25[-14]
70.5640	9.91[-15]	1.24[-14]	9.01[-15]	1.12[-14]	4.00[-15]	5.01[-15]	7.24[-15]	9.05[-15]
91.7332	6.93[-15]	8.66[-15]	6.35[-15]	7.93[-15]	2.84[-15]	3.55[-15]	5.15[-15]	6.44[-15]
119.2532	4.80[-15]	6.01[-15]	4.43[-15]	5.54[-15]	1.99[-15]	2.49[-15]	3.62[-15]	4.52[-15]
$T_e$ eV	$2s^27d (^1S)$		$2s^27i (^1S)$		$2s^28d (^1S)$		$2s^28i (^1S)$	
	$^2D_{3/2}$	$^2D_{5/2}$	$^2I_{11/2}$	$^2I_{13/2}$	$^2D_{3/2}$	$^2D_{5/2}$	$^2I_{11/2}$	$^2I_{13/2}$
0.1000	1.03[-14]	1.25[-14]	2.15[-62]	2.54[-62]	1.14[-14]	9.78[-15]	1.01[-61]	1.20[-61]
0.1300	1.13[-14]	1.47[-14]	1.19[-51]	1.40[-51]	1.32[-14]	1.06[-14]	5.57[-51]	6.60[-51]
0.1690	1.12[-14]	1.54[-14]	1.98[-43]	2.35[-43]	1.37[-14]	1.04[-14]	9.32[-43]	1.10[-42]
0.2197	1.03[-14]	1.48[-14]	3.84[-37]	4.55[-37]	1.29[-14]	9.46[-15]	1.80[-36]	2.13[-36]
0.2856	8.97[-15]	1.32[-14]	2.45[-32]	2.90[-32]	1.15[-14]	8.19[-15]	1.13[-31]	1.34[-31]
0.3713	7.43[-15]	1.12[-14]	1.79[-28]	2.11[-28]	9.77[-15]	6.89[-15]	5.08[-28]	6.02[-28]
0.4827	5.94[-15]	9.11[-15]	6.79[-25]	7.93[-25]	8.12[-15]	5.74[-15]	3.70[-25]	4.37[-25]
0.6275	4.65[-15]	7.23[-15]	6.03[-22]	7.04[-22]	6.70[-15]	4.80[-15]	1.55[-22]	1.81[-22]
0.8157	3.59[-15]	5.66[-15]	1.08[-19]	1.26[-19]	5.56[-15]	4.07[-15]	3.26[-20]	3.80[-20]
1.0604	2.79[-15]	4.43[-15]	5.35[-18]	6.24[-18]	4.73[-15]	3.52[-15]	2.10[-18]	2.45[-18]
1.3786	2.24[-15]	3.57[-15]	9.86[-17]	1.15[-16]	4.20[-15]	3.15[-15]	4.82[-17]	5.63[-17]
1.7922	2.05[-15]	3.25[-15]	8.47[-16]	9.88[-16]	4.04[-15]	3.01[-15]	4.92[-16]	5.74[-16]
2.3298	2.70[-15]	4.19[-15]	4.05[-15]	4.72[-15]	4.73[-15]	3.42[-15]	2.69[-15]	3.13[-15]
3.0287	4.90[-15]	7.45[-15]	1.23[-14]	1.44[-14]	7.18[-15]	5.00[-15]	9.05[-15]	1.06[-14]
3.9374	8.83[-15]	1.33[-14]	2.64[-14]	3.08[-14]	1.19[-14]	8.12[-15]	2.10[-14]	2.45[-14]
5.1186	1.36[-14]	2.04[-14]	4.35[-14]	5.07[-14]	1.82[-14]	1.22[-14]	3.68[-14]	4.29[-14]
6.6542	1.77[-14]	2.65[-14]	5.82[-14]	6.79[-14]	2.40[-14]	1.61[-14]	5.16[-14]	6.02[-14]
8.6504	1.99[-14]	2.99[-14]	6.65[-14]	7.76[-14]	2.75[-14]	1.84[-14]	6.11[-14]	7.13[-14]
11.2455	2.00[-14]	2.99[-14]	6.73[-14]	7.85[-14]	2.81[-14]	1.88[-14]	6.36[-14]	7.42[-14]
14.6192	1.83[-14]	2.74[-14]	6.20[-14]	7.24[-14]	2.62[-14]	1.75[-14]	5.99[-14]	6.98[-14]
19.0049	1.56[-14]	2.34[-14]	5.32[-14]	6.21[-14]	2.27[-14]	1.51[-14]	5.22[-14]	6.09[-14]
24.7064	1.27[-14]	1.90[-14]	4.32[-14]	5.04[-14]	1.85[-14]	1.24[-14]	4.29[-14]	5.00[-14]
32.1184	9.83[-15]	1.47[-14]	3.36[-14]	3.92[-14]	1.45[-14]	9.68[-15]	3.37[-14]	3.93[-14]
41.7539	7.39[-15]	1.11[-14]	2.53[-14]	2.95[-14]	1.10[-14]	7.32[-15]	2.55[-14]	2.98[-14]
54.2800	5.41[-15]	8.11[-15]	1.85[-14]	2.16[-14]	8.08[-15]	5.39[-15]	1.88[-14]	2.20[-14]
70.5640	3.89[-15]	5.83[-15]	1.33[-14]	1.56[-14]	5.84[-15]	3.89[-15]	1.36[-14]	1.59[-14]
91.7332	2.76[-15]	4.13[-15]	9.46[-15]	1.10[-14]	4.15[-15]	2.77[-15]	9.69[-15]	1.13[-14]
119.2532	1.93[-15]	2.89[-15]	6.63[-15]	7.73[-15]	2.91[-15]	1.94[-15]	6.81[-15]	7.94[-15]
$T_e$ eV	$2p^23s (^3P)$			$2p^23s (^3P)$		$2p^23s (^1D)$		$2s2p4f (^3P)$
	$^4P_{1/2}$	$^4P_{3/2}$	$^4P_{5/2}$	$^2P_{1/2}$	$^2P_{3/2}$	$^2D_{3/2}$	$^2D_{5/2}$	$^2F_{5/2}$
0.1000	6.69[-16]	2.04[-15]	1.71[-20]	7.26[-14]	1.24[-13]	1.21[-13]	1.47[-13]	7.31[-17]
0.1300	7.03[-16]	2.25[-15]	2.30[-19]	7.68[-14]	1.36[-13]	1.44[-13]	1.86[-13]	1.76[-16]

$T_e$ eV	$2p^23s$ ( $^3P$ )			$2p^23s$ ( $^3P$ )		$2p^23s$ ( $^1D$ )		$2s2p4f$ ( $^3P$ )
	$^4P_{1/2}$	$^4P_{3/2}$	$^4P_{5/2}$	$^2P_{1/2}$	$^2P_{3/2}$	$^2D_{3/2}$	$^2D_{5/2}$	$^2F_{5/2}$
0.1690	6.68[-16]	2.22[-15]	1.55[-18]	7.34[-14]	1.34[-13]	1.55[-13]	2.10[-13]	7.39[-16]
0.2197	5.89[-16]	2.03[-15]	6.13[-18]	6.55[-14]	1.23[-13]	1.55[-13]	2.16[-13]	3.38[-15]
0.2856	4.96[-16]	1.78[-15]	1.62[-17]	5.67[-14]	1.09[-13]	1.46[-13]	2.09[-13]	1.12[-14]
0.3713	4.10[-16]	1.55[-15]	3.14[-17]	4.99[-14]	9.85[-14]	1.34[-13]	1.94[-13]	2.61[-14]
0.4827	3.42[-16]	1.37[-15]	4.90[-17]	4.61[-14]	9.33[-14]	1.21[-13]	1.79[-13]	4.61[-14]
0.6275	2.94[-16]	1.24[-15]	6.62[-17]	4.40[-14]	9.10[-14]	1.10[-13]	1.63[-13]	6.56[-14]
0.8157	2.62[-16]	1.12[-15]	8.30[-17]	4.19[-14]	8.83[-14]	9.81[-14]	1.47[-13]	7.94[-14]
1.0604	2.43[-16]	1.01[-15]	1.01[-16]	3.90[-14]	8.35[-14]	8.59[-14]	1.29[-13]	8.54[-14]
1.3786	2.33[-16]	9.05[-16]	1.24[-16]	3.52[-14]	7.68[-14]	7.33[-14]	1.11[-13]	8.44[-14]
1.7922	2.27[-16]	8.05[-16]	1.51[-16]	3.10[-14]	6.92[-14]	6.11[-14]	9.27[-14]	7.85[-14]
2.3298	2.19[-16]	7.08[-16]	1.79[-16]	2.69[-14]	6.12[-14]	4.99[-14]	7.59[-14]	6.96[-14]
3.0287	2.04[-16]	6.11[-16]	2.08[-16]	2.29[-14]	5.32[-14]	4.00[-14]	6.11[-14]	5.93[-14]
3.9374	1.84[-16]	5.14[-16]	2.37[-16]	1.91[-14]	4.52[-14]	3.18[-14]	4.85[-14]	4.87[-14]
5.1186	1.58[-16]	4.20[-16]	2.64[-16]	1.57[-14]	3.73[-14]	2.50[-14]	3.82[-14]	3.87[-14]
6.6542	1.30[-16]	3.34[-16]	2.80[-16]	1.25[-14]	3.00[-14]	1.95[-14]	2.98[-14]	2.99[-14]
8.6504	1.03[-16]	2.58[-16]	2.80[-16]	9.78[-15]	2.35[-14]	1.50[-14]	2.30[-14]	2.24[-14]
11.2455	7.94[-17]	1.94[-16]	2.62[-16]	7.45[-15]	1.79[-14]	1.15[-14]	1.75[-14]	1.65[-14]
14.6192	5.95[-17]	1.43[-16]	2.30[-16]	5.55[-15]	1.33[-14]	8.61[-15]	1.31[-14]	1.19[-14]
19.0049	4.36[-17]	1.04[-16]	1.92[-16]	4.06[-15]	9.73[-15]	6.37[-15]	9.70[-15]	8.48[-15]
24.7064	3.14[-17]	7.39[-17]	1.53[-16]	2.92[-15]	6.99[-15]	4.64[-15]	7.06[-15]	5.97[-15]
32.1184	2.23[-17]	5.21[-17]	1.18[-16]	2.07[-15]	4.96[-15]	3.33[-15]	5.07[-15]	4.16[-15]
41.7539	1.56[-17]	3.64[-17]	8.80[-17]	1.46[-15]	3.48[-15]	2.36[-15]	3.60[-15]	2.88[-15]
54.2800	1.09[-17]	2.52[-17]	6.42[-17]	1.01[-15]	2.42[-15]	1.66[-15]	2.52[-15]	1.98[-15]
70.5640	7.52[-18]	1.74[-17]	4.61[-17]	7.02[-16]	1.67[-15]	1.16[-15]	1.76[-15]	1.36[-15]
91.7332	5.17[-18]	1.19[-17]	3.26[-17]	4.82[-16]	1.15[-15]	8.01[-16]	1.22[-15]	9.26[-16]
119.2532	3.54[-18]	8.13[-18]	2.28[-17]	3.30[-16]	7.86[-16]	5.51[-16]	8.37[-16]	6.30[-16]
$T_e$ eV	$2s2p4p$ ( $^3P$ )			$2s2p4p$ ( $^3P$ )				
	$^4D_{1/2}$	$^4D_{3/2}$	$^4D_{5/2}$	$^4D_{7/2}$	$^4S_{3/2}$	$^4P_{1/2}$	$^4P_{3/2}$	$^4P_{5/2}$
0.1000	4.28[-16]	5.10[-16]	5.25[-16]	1.03[-17]	4.13[-16]	1.65[-16]	5.19[-16]	1.29[-15]
0.1300	4.52[-16]	9.88[-16]	1.30[-15]	1.17[-16]	4.97[-16]	2.00[-16]	7.18[-16]	1.89[-15]
0.1690	4.39[-16]	3.04[-15]	4.90[-15]	7.01[-16]	7.72[-16]	2.91[-16]	1.36[-15]	3.30[-15]
0.2197	4.18[-16]	8.88[-15]	1.54[-14]	2.55[-15]	1.73[-15]	5.88[-16]	3.37[-15]	7.29[-15]
0.2856	4.20[-16]	1.98[-14]	3.55[-14]	6.32[-15]	3.90[-15]	1.23[-15]	7.64[-15]	1.57[-14]
0.3713	4.60[-16]	3.42[-14]	6.22[-14]	1.16[-14]	7.21[-15]	2.19[-15]	1.39[-14]	2.81[-14]
0.4827	5.49[-16]	4.77[-14]	8.79[-14]	1.70[-14]	1.08[-14]	3.26[-15]	2.04[-14]	4.14[-14]
0.6275	7.17[-16]	5.69[-14]	1.05[-13]	2.09[-14]	1.38[-14]	4.21[-15]	2.55[-14]	5.18[-14]
0.8157	1.00[-15]	6.04[-14]	1.12[-13]	2.26[-14]	1.56[-14]	4.96[-15]	2.80[-14]	5.72[-14]
1.0604	1.41[-15]	5.91[-14]	1.10[-13]	2.22[-14]	1.63[-14]	5.52[-15]	2.83[-14]	5.81[-14]
1.3786	1.90[-15]	5.47[-14]	1.01[-13]	2.06[-14]	1.62[-14]	5.93[-15]	2.71[-14]	5.59[-14]
1.7922	2.37[-15]	4.88[-14]	9.00[-14]	1.83[-14]	1.56[-14]	6.17[-15]	2.51[-14]	5.21[-14]
2.3298	2.70[-15]	4.22[-14]	7.72[-14]	1.58[-14]	1.45[-14]	6.17[-15]	2.26[-14]	4.72[-14]
3.0287	2.81[-15]	3.53[-14]	6.42[-14]	1.33[-14]	1.30[-14]	5.89[-15]	1.99[-14]	4.16[-14]
3.9374	2.69[-15]	2.87[-14]	5.18[-14]	1.09[-14]	1.13[-14]	5.34[-15]	1.69[-14]	3.54[-14]
5.1186	2.39[-15]	2.27[-14]	4.07[-14]	8.66[-15]	9.33[-15]	4.60[-15]	1.39[-14]	2.91[-14]
6.6542	2.01[-15]	1.74[-14]	3.11[-14]	6.70[-15]	7.45[-15]	3.79[-15]	1.10[-14]	2.31[-14]
8.6504	1.61[-15]	1.30[-14]	2.32[-14]	5.06[-15]	5.76[-15]	3.00[-15]	8.48[-15]	1.78[-14]
11.2455	1.25[-15]	9.56[-15]	1.70[-14]	3.74[-15]	4.33[-15]	2.30[-15]	6.37[-15]	1.34[-14]
14.6192	9.34[-16]	6.90[-15]	1.22[-14]	2.71[-15]	3.18[-15]	1.71[-15]	4.67[-15]	9.82[-15]
19.0049	6.83[-16]	4.90[-15]	8.65[-15]	1.94[-15]	2.29[-15]	1.25[-15]	3.37[-15]	7.08[-15]
24.7064	4.91[-16]	3.45[-15]	6.07[-15]	1.37[-15]	1.63[-15]	8.95[-16]	2.40[-15]	5.03[-15]
32.1184	3.48[-16]	2.40[-15]	4.23[-15]	9.55[-16]	1.14[-15]	6.33[-16]	1.68[-15]	3.54[-15]
41.7539	2.44[-16]	1.66[-15]	2.92[-15]	6.63[-16]	7.97[-16]	4.43[-16]	1.17[-15]	2.46[-15]
54.2800	1.69[-16]	1.14[-15]	2.01[-15]	4.57[-16]	5.51[-16]	3.07[-16]	8.10[-16]	1.70[-15]

$T_e$ eV	$2s2p4p$ ( $^3P$ )				$2s2p4p$ ( $^3P$ )			
	$^4D_{1/2}$	$^4D_{3/2}$	$^4D_{5/2}$	$^4D_{7/2}$	$^4S_{3/2}$	$^4P_{1/2}$	$^4P_{3/2}$	$^4P_{5/2}$
70.5640	1.17[-16]	7.82[-16]	1.37[-15]	3.13[-16]	3.79[-16]	2.12[-16]	5.57[-16]	1.17[-15]
91.7332	8.01[-17]	5.34[-16]	9.37[-16]	2.14[-16]	2.59[-16]	1.45[-16]	3.81[-16]	8.01[-16]
119.2532	5.47[-17]	3.63[-16]	6.38[-16]	1.46[-16]	1.77[-16]	9.93[-17]	2.60[-16]	5.46[-16]
$T_e$ eV	$2s2p4p$ ( $^3P$ )		$2s2p4p$ ( $^3P$ )			$2s2p4f$ ( $^3P$ )		
	$^2P_{1/2}$	$^2P_{3/2}$	$^2D_{3/2}$	$^2D_{5/2}$	$^2S_{1/2}$	$^2F_{7/2}$	$^2D_{3/2}$	$^2D_{5/2}$
0.1000	1.33[-13]	2.22[-13]	3.74[-13]	4.33[-13]	1.73[-13]	9.25[-17]	2.57[-15]	2.89[-15]
0.1300	1.41[-13]	2.43[-13]	4.21[-13]	5.23[-13]	1.87[-13]	2.20[-16]	2.87[-15]	3.47[-15]
0.1690	1.34[-13]	2.39[-13]	4.33[-13]	5.65[-13]	1.82[-13]	8.58[-16]	3.72[-15]	4.85[-15]
0.2197	1.18[-13]	2.18[-13]	4.12[-13]	5.59[-13]	1.63[-13]	3.76[-15]	8.35[-15]	1.14[-14]
0.2856	9.94[-14]	1.89[-13]	3.70[-13]	5.16[-13]	1.38[-13]	1.22[-14]	2.33[-14]	3.17[-14]
0.3713	8.15[-14]	1.62[-13]	3.19[-13]	4.56[-13]	1.13[-13]	2.82[-14]	5.36[-14]	7.24[-14]
0.4827	6.66[-14]	1.40[-13]	2.68[-13]	3.92[-13]	9.17[-14]	4.94[-14]	9.59[-14]	1.29[-13]
0.6275	5.49[-14]	1.23[-13]	2.21[-13]	3.31[-13]	7.49[-14]	6.99[-14]	1.38[-13]	1.84[-13]
0.8157	4.58[-14]	1.07[-13]	1.81[-13]	2.76[-13]	6.20[-14]	8.40[-14]	1.69[-13]	2.24[-13]
1.0604	3.83[-14]	9.31[-14]	1.48[-13]	2.29[-13]	5.23[-14]	8.94[-14]	1.81[-13]	2.40[-13]
1.3786	3.19[-14]	7.96[-14]	1.21[-13]	1.89[-13]	4.52[-14]	8.71[-14]	1.76[-13]	2.33[-13]
1.7922	2.63[-14]	6.69[-14]	9.87[-14]	1.56[-13]	4.00[-14]	7.93[-14]	1.60[-13]	2.12[-13]
2.3298	2.15[-14]	5.52[-14]	8.08[-14]	1.28[-13]	3.57[-14]	6.86[-14]	1.38[-13]	1.82[-13]
3.0287	1.73[-14]	4.47[-14]	6.57[-14]	1.05[-13]	3.16[-14]	5.69[-14]	1.13[-13]	1.50[-13]
3.9374	1.37[-14]	3.55[-14]	5.27[-14]	8.44[-14]	2.75[-14]	4.55[-14]	8.98[-14]	1.19[-13]
5.1186	1.06[-14]	2.76[-14]	4.16[-14]	6.66[-14]	2.32[-14]	3.53[-14]	6.91[-14]	9.15[-14]
6.6542	8.06[-15]	2.11[-14]	3.21[-14]	5.14[-14]	1.89[-14]	2.67[-14]	5.19[-14]	6.87[-14]
8.6504	6.02[-15]	1.58[-14]	2.43[-14]	3.88[-14]	1.50[-14]	1.97[-14]	3.82[-14]	5.05[-14]
11.2455	4.42[-15]	1.16[-14]	1.80[-14]	2.88[-14]	1.15[-14]	1.43[-14]	2.76[-14]	3.65[-14]
14.6192	3.19[-15]	8.40[-15]	1.31[-14]	2.10[-14]	8.65[-15]	1.02[-14]	1.97[-14]	2.60[-14]
19.0049	2.28[-15]	6.00[-15]	9.41[-15]	1.50[-14]	6.36[-15]	7.21[-15]	1.39[-14]	1.83[-14]
24.7064	1.61[-15]	4.24[-15]	6.67[-15]	1.07[-14]	4.59[-15]	5.04[-15]	9.68[-15]	1.28[-14]
32.1184	1.12[-15]	2.97[-15]	4.68[-15]	7.47[-15]	3.27[-15]	3.49[-15]	6.70[-15]	8.86[-15]
41.7539	7.78[-16]	2.06[-15]	3.26[-15]	5.20[-15]	2.30[-15]	2.41[-15]	4.62[-15]	6.10[-15]
54.2800	5.36[-16]	1.42[-15]	2.25[-15]	3.59[-15]	1.61[-15]	1.65[-15]	3.17[-15]	4.18[-15]
70.5640	3.68[-16]	9.77[-16]	1.55[-15]	2.47[-15]	1.11[-15]	1.13[-15]	2.16[-15]	2.86[-15]
91.7332	2.52[-16]	6.68[-16]	1.06[-15]	1.69[-15]	7.66[-16]	7.68[-16]	1.47[-15]	1.95[-15]
119.2532	1.71[-16]	4.55[-16]	7.23[-16]	1.15[-15]	5.25[-16]	5.22[-16]	1.00[-15]	1.32[-15]
$T_e$ eV	$2s2p4f$ ( $^3P$ )				$2s2p4f$ ( $^3P$ )			
	$^4F_{3/2}$	$^4F_{5/2}$	$^4F_{7/2}$	$^4F_{9/2}$	$^4D_{1/2}$	$^4D_{3/2}$	$^4D_{5/2}$	$^4D_{7/2}$
0.1000	2.88[-19]	1.07[-17]	1.23[-17]	3.86[-18]	6.96[-21]	2.62[-18]	2.31[-16]	1.37[-18]
0.1300	5.99[-18]	4.16[-17]	4.85[-17]	8.06[-17]	9.72[-20]	6.90[-17]	3.62[-16]	2.87[-17]
0.1690	5.99[-17]	2.79[-16]	3.09[-16]	7.89[-16]	7.00[-19]	7.85[-16]	1.39[-15]	2.90[-16]
0.2197	3.29[-16]	1.44[-15]	1.56[-15]	4.22[-15]	3.01[-18]	4.66[-15]	6.84[-15]	1.61[-15]
0.2856	1.12[-15]	4.90[-15]	5.21[-15]	1.41[-14]	8.64[-18]	1.68[-14]	2.37[-14]	5.57[-15]
0.3713	2.66[-15]	1.16[-14]	1.23[-14]	3.27[-14]	1.81[-17]	4.10[-14]	5.74[-14]	1.33[-14]
0.4827	4.74[-15]	2.06[-14]	2.18[-14]	5.70[-14]	2.95[-17]	7.44[-14]	1.04[-13]	2.38[-14]
0.6275	6.87[-15]	2.94[-14]	3.11[-14]	8.03[-14]	4.00[-17]	1.08[-13]	1.50[-13]	3.41[-14]
0.8157	8.68[-15]	3.58[-14]	3.77[-14]	9.62[-14]	4.83[-17]	1.32[-13]	1.83[-13]	4.13[-14]
1.0604	1.02[-14]	3.88[-14]	4.03[-14]	1.02[-13]	5.74[-17]	1.41[-13]	1.96[-13]	4.42[-14]
1.3786	1.15[-14]	3.90[-14]	3.94[-14]	9.99[-14]	7.30[-17]	1.38[-13]	1.92[-13]	4.31[-14]
1.7922	1.26[-14]	3.71[-14]	3.61[-14]	9.14[-14]	9.77[-17]	1.25[-13]	1.75[-13]	3.91[-14]
2.3298	1.32[-14]	3.38[-14]	3.13[-14]	7.95[-14]	1.26[-16]	1.07[-13]	1.52[-13]	3.37[-14]
3.0287	1.31[-14]	2.96[-14]	2.60[-14]	6.63[-14]	1.49[-16]	8.80[-14]	1.26[-13]	2.77[-14]
3.9374	1.22[-14]	2.50[-14]	2.08[-14]	5.34[-14]	1.60[-16]	6.97[-14]	1.00[-13]	2.20[-14]
5.1186	1.07[-14]	2.03[-14]	1.62[-14]	4.17[-14]	1.55[-16]	5.37[-14]	7.77[-14]	1.70[-14]
6.6542	8.87[-15]	1.60[-14]	1.23[-14]	3.17[-14]	1.40[-16]	4.03[-14]	5.86[-14]	1.28[-14]
8.6504	7.07[-15]	1.22[-14]	9.06[-15]	2.35[-14]	1.18[-16]	2.96[-14]	4.33[-14]	9.39[-15]

$T_e$ eV	$2s2p4f$ ( $^3P$ )				$2s2p4f$ ( $^3P$ )			
	$^4F_{3/2}$	$^4F_{5/2}$	$^4F_{7/2}$	$^4F_{9/2}$	$^4D_{1/2}$	$^4D_{3/2}$	$^4D_{5/2}$	$^4D_{7/2}$
11.2455	5.43[-15]	9.09[-15]	6.58[-15]	1.71[-14]	9.47[-17]	2.13[-14]	3.14[-14]	6.78[-15]
14.6192	4.06[-15]	6.63[-15]	4.70[-15]	1.22[-14]	7.31[-17]	1.52[-14]	2.24[-14]	4.83[-15]
19.0049	2.96[-15]	4.76[-15]	3.32[-15]	8.66[-15]	5.47[-17]	1.07[-14]	1.58[-14]	3.40[-15]
24.7064	2.13[-15]	3.37[-15]	2.32[-15]	6.06[-15]	4.00[-17]	7.45[-15]	1.10[-14]	2.37[-15]
32.1184	1.50[-15]	2.36[-15]	1.61[-15]	4.21[-15]	2.87[-17]	5.16[-15]	7.64[-15]	1.64[-15]
41.7539	1.05[-15]	1.64[-15]	1.11[-15]	2.90[-15]	2.03[-17]	3.55[-15]	5.26[-15]	1.13[-15]
54.2800	7.31[-16]	1.13[-15]	7.60[-16]	1.99[-15]	1.42[-17]	2.43[-15]	3.61[-15]	7.74[-16]
70.5640	5.04[-16]	7.76[-16]	5.19[-16]	1.36[-15]	9.88[-18]	1.66[-15]	2.47[-15]	5.29[-16]
91.7332	3.46[-16]	5.30[-16]	3.54[-16]	9.29[-16]	6.81[-18]	1.13[-15]	1.68[-15]	3.60[-16]
119.2532	2.36[-16]	3.61[-16]	2.41[-16]	6.32[-16]	4.67[-18]	7.68[-16]	1.14[-15]	2.45[-16]
$T_e$ eV	$2s2p4f$ ( $^3P$ )				$2s2p4f$ ( $^3P$ )		$2s2p5s$ ( $^3P$ )	
	$^4G_{5/2}$	$^4G_{7/2}$	$^4G_{9/2}$	$^4G_{11/2}$	$^2G_{7/2}$	$^2G_{9/2}$	$^4P_{5/2}$	
0.1000	2.43[-18]	3.31[-17]	2.83[-17]	1.34[-19]	4.24[-16]	5.00[-16]	1.38[-16]	
0.1300	5.12[-17]	1.17[-16]	1.31[-16]	3.30[-18]	7.45[-16]	8.87[-16]	4.68[-16]	
0.1690	5.24[-16]	5.09[-16]	7.26[-16]	3.56[-17]	1.17[-15]	1.36[-15]	1.16[-15]	
0.2197	2.93[-15]	1.85[-15]	3.07[-15]	2.03[-16]	2.03[-15]	2.19[-15]	2.19[-15]	
0.2856	1.02[-14]	5.00[-15]	9.15[-15]	7.07[-16]	4.10[-15]	4.07[-15]	3.29[-15]	
0.3713	2.43[-14]	1.02[-14]	1.99[-14]	1.69[-15]	7.90[-15]	7.57[-15]	4.14[-15]	
0.4827	4.35[-14]	1.65[-14]	3.37[-14]	3.02[-15]	1.30[-14]	1.23[-14]	4.53[-15]	
0.6275	6.25[-14]	2.21[-14]	4.65[-14]	4.31[-15]	1.78[-14]	1.69[-14]	4.49[-15]	
0.8157	7.62[-14]	2.57[-14]	5.51[-14]	5.21[-15]	2.12[-14]	2.02[-14]	4.17[-15]	
1.0604	8.27[-14]	2.68[-14]	5.82[-14]	5.55[-15]	2.26[-14]	2.15[-14]	3.77[-15]	
1.3786	8.25[-14]	2.60[-14]	5.66[-14]	5.38[-15]	2.22[-14]	2.11[-14]	3.41[-15]	
1.7922	7.75[-14]	2.38[-14]	5.18[-14]	4.87[-15]	2.06[-14]	1.95[-14]	3.12[-15]	
2.3298	6.94[-14]	2.08[-14]	4.52[-14]	4.18[-15]	1.82[-14]	1.71[-14]	2.86[-15]	
3.0287	5.97[-14]	1.76[-14]	3.80[-14]	3.44[-15]	1.55[-14]	1.44[-14]	2.59[-15]	
3.9374	4.94[-14]	1.44[-14]	3.08[-14]	2.74[-15]	1.27[-14]	1.17[-14]	2.26[-15]	
5.1186	3.95[-14]	1.13[-14]	2.42[-14]	2.11[-15]	1.01[-14]	9.26[-15]	1.91[-15]	
6.6542	3.06[-14]	8.72[-15]	1.85[-14]	1.59[-15]	7.80[-15]	7.10[-15]	1.54[-15]	
8.6504	2.31[-14]	6.54[-15]	1.38[-14]	1.17[-15]	5.88[-15]	5.31[-15]	1.21[-15]	
11.2455	1.71[-14]	4.80[-15]	1.01[-14]	8.51[-16]	4.33[-15]	3.90[-15]	9.18[-16]	
14.6192	1.24[-14]	3.46[-15]	7.29[-15]	6.08[-16]	3.13[-15]	2.81[-15]	6.80[-16]	
19.0049	8.81[-15]	2.46[-15]	5.18[-15]	4.29[-16]	2.23[-15]	1.99[-15]	4.94[-16]	
24.7064	6.21[-15]	1.73[-15]	3.63[-15]	2.99[-16]	1.57[-15]	1.40[-15]	3.53[-16]	
32.1184	4.33[-15]	1.21[-15]	2.53[-15]	2.08[-16]	1.10[-15]	9.76[-16]	2.49[-16]	
41.7539	3.00[-15]	8.35[-16]	1.75[-15]	1.43[-16]	7.61[-16]	6.75[-16]	1.74[-16]	
54.2800	2.07[-15]	5.74[-16]	1.20[-15]	9.81[-17]	5.24[-16]	4.64[-16]	1.21[-16]	
70.5640	1.42[-15]	3.93[-16]	8.23[-16]	6.70[-17]	3.59[-16]	3.18[-16]	8.32[-17]	
91.7332	9.67[-16]	2.69[-16]	5.61[-16]	4.57[-17]	2.45[-16]	2.17[-16]	5.70[-17]	
119.2532	6.58[-16]	1.83[-16]	3.82[-16]	3.11[-17]	1.67[-16]	1.48[-16]	3.90[-17]	

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