

§4. Environmental Radiation Monitoring at Toki Area

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Environmental radiation monitoring activity has been continued to define radiological distribution and behavior with time elapse under natural conditions. To clarify the regional radiological characteristics means to study environmental dynamics at the view points of geological effect to the local area according to operation of LHD and the other devices. This study started as collaboration with the Plasma Research Committee trusted by a board of education of Toki-city. It is significant at the point of discussing and working together with researchers of the institute and teachers of public schools at Toki area. Radiation monitoring methods and the results of this study are as follows.

TLD (thermo luminescence dosimeter) pellets (CaSO₄.Tm, UD-200S; Matsushita Elec. Co.) were set at 15 posts at Toki area for 3 months (exchanged in June, September, December and March). Figure 1 shows radiation exposure rate at the representative posts since 5 years ago. The environmental radiation exposure rates are distributing in 50-150 mR/y. Sensitivities for several detectors are compared using TLD, an ionization chamber, a NaI scintillator and a Ge semiconductor. Figure 2 compares observed radiation dose rates for various detectors versus the NaI scintillator. Exposure rates obtained from the ionization chamber and the TLD are higher than the rates from the NaI and the Ge detectors. This is because the NaI and the Ge detectors dose not count high energy radiation like cosmic rays. These cosmic rays must be the same level and independent on monitoring places at the local Toki area. Radiation sources caused the high dose rate considered to be surface materials like soil and concrete building. As shown in Fig. 3, it is

observed by energy spectrum analyses that radioactivity from potassium and thorium series are varied, but those of uranium series are almost constant.

It was confirmed that TLD is applicable as an useful environmental radiation monitor, and an ionization chamber is applied as a relative one. The next goal is to measure by discriminating environmental radiation sources.

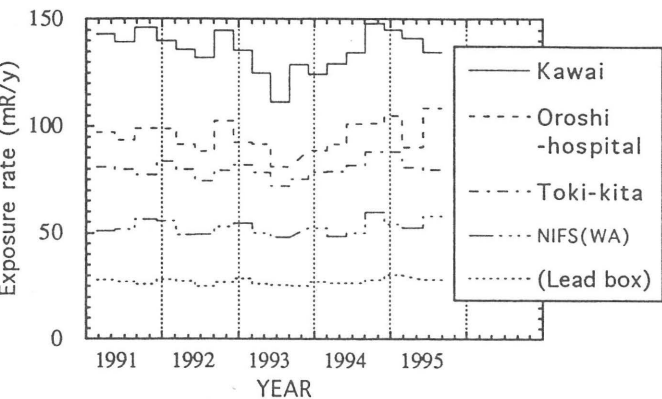


Fig.1 Environmental radiation dose rate at Toki area detected by TLD.

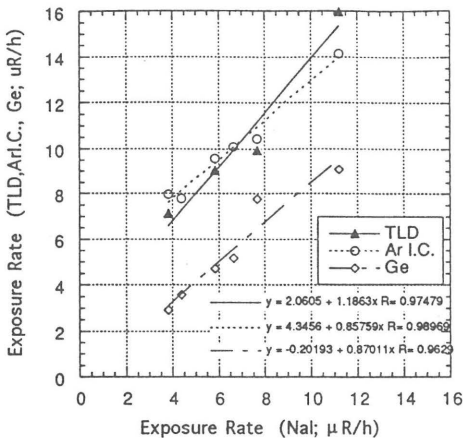


Fig.2 Sensitivity of TLD, ionization chamber and Ge detector compared to NaI scintillator.

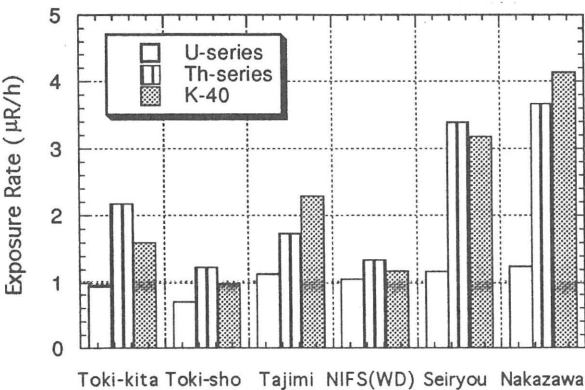


Fig.3 Nuclear analysis at some monitoring posts by Ge detector.