## §3. A Dual Type Ionization Chamber for Monitoring n-X Mixed Fields

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A dual type ionization chamber system has been developed for dosimetry use of n-X mixed fields. This is composed of a pair of cylindrical vessels of the same size and shape, one containing $^3$He gas sensitive to both n and X, and the other $^4$He insensitive to neutrons.

The ionization chambers, 1 liter in volume and gas-filled at 3 different gas pressures (1, 2 and 3 atm), have been examined with various kinds of radiation sources[1,2]. In the present study, a set of 100 cc chambers filled with 1 atm gas pressure are prepared and placed inside the $D_2O$ thermalised neutron area of the KUR.

The observed responses of $^3$He and $^4$He chambers against the reactor power are summarised in Figure 1 and 2. The output currents from the 100 cc $^3$He chamber are closely proportional to the reactor operating powers, or fission neutron yields. This result is the same as that of the 1 liter chamber. On the other hand, the 100 cc $^4$He chamber seems less efficient to detect gamma rays when the reactor power is below 10 kW. It gives 6mSv per hour as the dose rate due to gamma rays.

The ratio of the output currents from the 100 cc chamber to the 1 liter is 0.07 for $^3$He, and 0.007 for $^4$He when measured without polyethylene moderators. This size effect will be analysed in detail.

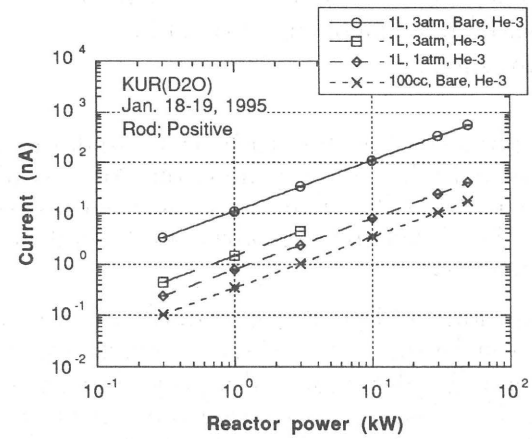


Fig. 1 Relationship between $^3$He output currents and reactor power

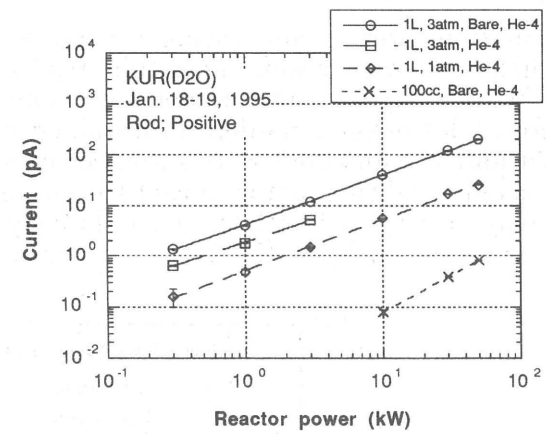


Fig.2 Relationship between $^4$He output currents and reactor power

REFFERENCES :

1. J. Kodaira et al., Proc. 8th Symp. on Acc. Sci.&Tech. (RIKEN) (1991) 443.
2. H. Obayashi et al., Proc. 8th IRPA (1992) Vol.1, 140.