179   **Determination of the Relative Neutron Sensitivity for a C-CO2 Ionization Chamber**

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The relative neutron sensitivity for a $C-CO_2$ ionization chamber has been determined in the energy region from 0.1 to 1MeV by using neutron beam from a neutron generator (Hi-GENE) at RIRBM, Hiroshima University. The measured sensitivity ranged from 0.04 to 1.0 as a function of the neutron energy. We found that the sensitivity for $C-CO_2$ ionization chamber has two peak like structures at neutron energies of about 0.4 and 1MeV. These results are smoothly joined to the data measured at NIRS. The energy dependence of the sensitivity for $C-CO_2$ ionization chamber has small discrepancies between our data and a calculation by Waterman et al., which was extrapolated from measured data energy region down to 1MeV into low energy.

180   **Development of Alpha-ray Irradiation System.**

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We have developed a system to irradiate cultured cells with alpha rays. The alpha source is 36 MBq Am-241 which is plated on a 35 mm ϕ metal disc. Cells irradiated is placed on a mylar film which is supported by 30 mm ϕ glass tube. Space between the alpha source and the mylar film is filled with helium gas to minimize energy loss. Distance between source and sample is continuously variable to change energy spectrum. Various size of collimator can be attached in front of source to adjust dose rate.

Dosimetry was performed using silicon semiconductor detector and CR-39 track detector. A computer program was developed to calculate energy spectrum, dose rates and etc. for any condition (distance, diameter of collimator in front of alpha source, location on sample dish, atmospheric pressure, temperature) by interpolating finite number of measured energy spectra and track numbers.

Some interesting biological results already have been obtained with this system.

181   Theory of Dual Radiation Action Applied to Mammalian Reproductive Death by Heavy Charged Particles

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The site model of the theory is based on single event spectrum. As there is difficulty to obtain the spectrum for heavy charged particles, this work estimated them by the radial dose distributions. The theory is applicable for intra track component and gives an expression of inactivation cross section for mammalian reproductive death as a function of site diameter, the maximum energy deposition of the site, the maximum range of secondary electrons, saturation energy and biological response parameter. Comparisons in cross sections with experiments was made.