285

ESTIMATION OF EXCITATION FUNCTION AND PRODUCTION YIELD OF Hg AND Co ISOTOPES BY STACK FOIL METHOD

Y.Tanaka,Y.Mori,M.Takahashi and S.Nakamoto
No.1 Technical Section,Technical Department, NIHON MEDI-PHYSICS CO.,LTD.,Takarazuka

Previously, we reported the excitation function of Zn-63 and Zn-62 via reaction of Cu-63(p,n) and Cu-63(p,2n) with our CS-30 cyclotrons. (proton energy 26MeV) Using these data we estimate the excitation function and RI production yield of Hg-195m and Co-55 by irradiating Au and Fe foils.

Hg-195m and Co-55 are expected very useful in the field of nuclear medicine as Hg-195m=Au-195m generator and Co-55 bleomycin.

As the experimental method,around 20 sheets of Au foil and Fe foil were bombarded with Cu foils sandwiched. Thickness of each foil was 0.02-0.05mm in order for the energy loss in the foil to be less than 1MeV.

After the bombardment,activity of each foil was measured with Ge-Li detector connected to the 2000ch MCA. The integrated beam current was calculated by the activity of Zn-63 and Zn-62 from Cu foils.

As the result,the best conditions of the bombardment for our cyclotrons are :

1) for Hg-195m: 0.4g/cm2 thick Au target in which energy loss is 6MeV,provides yield rate of 2mCi/uAhr.

2) for Co-55: 0.5g/cm2 thick Fe target in which energy loss is 7MeV,provides yield rate of 2mCi/uAhr.

The radio-contaminants produced at the same time will also be reported.

286

CORRECTION OF EXCITATION FUNCTION DERIVED BY STACK FOIL METHOD.

S.Nakamoto, Y.Tanaka, Y.Mori and M.Takahashi. No.1 Technical Section, Technical Department, NIHON MEDI-PHYSICS CO., LTD., Takarazuka.

The proton energy of our cyclotrons (CS-30) was estimated by the proton range measurement in Copper foils with the surface barrier detectors. The energy spectra of protons through the foils varied depending on the foil thickness, due to the multiple scattering and energy straggling. To estimate the cross section or excitation function of nuclear reactions by the stack foil method, the sharpness of the incident proton spectra must be known. Especially at the up and down slope region of the excitation function, the values of the cross section tend to be inaccurate. Usually the excitation function can be represented by exponential functions, and the measured proton spectra approximated to Gaussian distributions. The correction factors of the experimental cross section values were calculated. As the result, it was found that the values must be corrected by the factor of 2-600% at the threshold energy region of (p,n) reaction, and after the threshold, the correction is not so important (below 1%). The accelerated proton energy of our cyclotrons is 26.5±0.1 MeV at Meditron, and 26.0±0.1 MeV at Physitron.