

PRODUCTION OF ^{129}Te SOURCES BY (n,γ) AND $(n,2n)$ REACTIONS FOR NUCLEAR INVESTIGATIONS

Oliveira, V. X. *; Zamboni, C. B.; Berretta, J. R.; Madi F., Tufic

vania@curiango.ipen.br; czamboni@baitaca.ipen.br; jrretta@baitaca.ipen.br

Two different methods have been employed for the production of ^{129}Te radioactive sources. The first one involved the irradiation of the 96% enriched ^{128}Te samples with thermal neutrons in the IEA-R1 reactor at IPEN/CNEN - São Paulo. The second was the irradiation of natural tellurium (with 33,87% of ^{130}Te isotope) with 14MeV neutrons at Van de Graaff accelerator at IPEN - São Paulo. Since ^{129}Te isotope appears as ^{129g}Te ($T_{1/2}=70$ minutes) and ^{129m}Te ($T_{1/2}=33$ days), the source production parameters to be evaluated are : appropriated masses and irradiation time-intervals for both (n,γ) and $(n,2n)$ reactions, in the cases of short and long-lived isotopes. A comparison between these two methods of source production was made, and a large range of γ -rays were observed and analyzed through the gamma spectrum.

An intrinsic Ge(Li) detector with 45 cm^3 (FWHM < 2.0 keV at 1332 keV) coupled with typical counting system were used to measure the gamma-ray spectrum of ^{129}Te irradiated. The detector was calibrated for energy and efficiency using standard sources of ^{60}Co , ^{88}Y , ^{109}Cd , ^{133}Ba , ^{137}Cs , ^{152}Eu and ^{241}Am .

The identification of all gamma-rays was made in two ways: determining the energy of photopeaks and their desintegration periods.

By means of mass and time irradiation evaluation we intend to perform spectroscopy and angular correlation measurements following both beta decays of ^{129}Te .