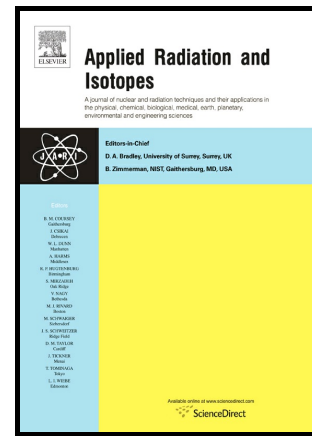


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Analysis of MCNP simulated gamma spectra of CdTe detectors for Boron Neutron Capture Therapy

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Abstract

The next step in the boron neutron capture therapy (BNCT) is the real time imaging of the boron concentration in healthy and tumor tissue. Monte Carlo simulations are employed to predict the detector response required to realize single-photon emission computed tomography in BNCT, but have failed to correctly resemble measured data for cadmium telluride detectors. In this study we have tested the gamma production cross-section data tables of commonly used libraries in the Monte Carlo code MCNP in comparison to measurements. The cross section data table *TENDL-2008-ACE* is reproducing measured data best, whilst the commonly used *ENDL92* and other studied libraries do not include correct tables for the gamma production from the cadmium neutron capture reaction that is occurring inside the detector. Furthermore, we have discussed the size of the annihilation peaks of spectra obtained by cadmium telluride and germanium detectors.

Keywords:

BNCT, MCNP, CdTe /CdZnTe (CZT), prompt gamma spectrum, neutron detection, annihilation peak

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