Characterization of the terminal column of TRIGA Mark II reactor of Mainz through of alanine pellets.

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Comunicazione

VI - Fisica applicata, acceleratori e beni culturali

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We have studied the ESR response of alanine pellets with and without gadolinium exposed to the thermal column of the TRIGA Mark II research reactor at the University of Mainz (Germany). The choice of Gd as additive nucleus is due to its very high capture cross section to thermal neutrons and to the possibility for secondary particles produced after interaction with thermal neutrons of releasing their energy in the neighborhood of the reaction site. In particular, it was found that low concentration (5% by weight) of Gd brings about a neutron sensitivity enhancement of more than 10 times without heavily reducing tissue equivalence. Monte Carlo (MC) simulations of both response of alanine and Gd-alanine pellets with FLUKA code were performed and the results were compared with the experimental values.