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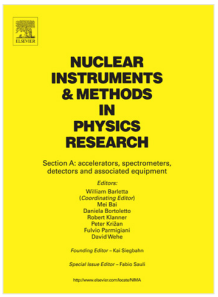

Measurement of thick target neutron yield from the reaction ($p + {}^{181}$Ta) with projectiles in the range of 6–20 MeV

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Measurement of thick target neutron yield from the reaction (p + ^{181}Ta) with projectiles in the range of 6-20 MeV

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Abstract

^{181}Ta is a commonly used backing material for many targets in nuclear reaction studies. When the target thickness is less than the range of bombarded projectiles, the interaction via Ta(p,n) reactions in the backing can be a significant source of background. In this study, the neutron spectral yields from the reaction of protons of different energies (between 6 to 20 MeV) with a thick Ta target were determined using CR-39 detectors. The results from this study can be used as a correction factor in such situations. The parameters of registered tracks in CR-39 were analysed using an in-house image analysing program autoTRAK_n and then to derive the associated dose values. The spectral yields obtained experimentally were compared with those obtained from the theoretical calculations. The neutron yield was found to increase with increase in projectile energy mainly due to the opening of reaction channels from (p,n) to (p,3n).

Keywords: Neutron spectral yield, proton on Ta, CR-39, autoTRAK_n.

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