

Energy discrimination by shape selection in etched track detection technique

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Abstract: A shape selection method corresponding to energy discrimination above the detection threshold energy was used to eliminate unwanted events disturbing evaluation of exposed CR-39 etched track detectors. Detectors were irradiated with monoenergetic protons (0.5-3.5 MeV) and etched in 6 N NaOH solution at 70°C for various times (2.5-31 h) to determine the energy discrimination level for protons, established as 0.5±0.1 MeV. Recoil protons generated by fast neutrons emitted by ²⁵²Cf were detected with a shape selection technique at various distances from the source in air and berated water. The threshold level for fast neutrons and neutron-induced recoil charged particles is discussed. Etching time is optimised for detecting fast neutrons emitted by spent fuel assemblies, with special consideration for recoil H, C and O ions.

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