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FISSION SPECTRUM AVERAGED ACTIVATION CROSS--SECTIONS FOR SOME NEUTRON DETECTORS

ABSTRACT: Cross-sections averaged over the neutron spectrum of standard and reference neutron fields play an important role in neutron cross-section evaluation. Here cross-section measurements in the fast neutron field of a uranium convertor are described for some detectors used in reactor dosimetry. The convertor was a plate 260 mm in diameter and 1.5 mm thick clad with 0.8 mm of aluminium. It was located in the 2.4 x 2.4 x 3.5 m large exposure room of the TRIGA reactor in Ljubljana and driven by thermal neutrons from the thermalizing column. Samples were irradiated 30 mm behind the convertor plate. The fast neutron flux was from 2.10^7 to 2.10^8 $ncm^{-2}s^{-1}$, depending on the distance of the convertor from the beam port of the thermalizing column. The following reactions were investigated: $^{103}Rh(n,n')$, $^{115}In(n,n')$, $^{64}Zn(n,p)$, $^{27}Al(n, alpha)$, $^{27}Al(n,p)$, $^{56}Fe(n,p)$, $^{24}Mg(n,p)$ and $^{19}F(n,2n)$. Activities induced in samples were determined by a calibrated 3" x 3" NaI(Tl) gamma spectrometer, except for the $^{103}Rh(n,n')$ reaction where the resulting X-ray radiation was counted by a thin 1.5" dia x 2 mm thick NaI(Tl) scintillator covered by a thin beryllium window. Results are given relative to the cross-section for the $^{27}Al(n, alpha)\ ^{24}Na$ reaction which was selected as the monitoring detector.