Measurement of the 232 Th $(n, \gamma)^{233}$ Th and 232 Th $(n, 2n)^{231}$ Th reaction cross-sections at neutron energy of 8.04 MeV

Rita Crasta¹*, H. Naik², S.V. Suryanarayana³, Ganesh Sanjeev¹, B.S. Shivashankar⁴, V. K. Mulik⁵, P. M. Prajapati⁶, S.C. Sharma³, A.K. Mohanty³, P.V. Bhagwat³, S. Ganesan⁶ and A. Goswami²

¹Dept. of Studies in Phys., Microtron Centre, Mangalore Univ., Mangalagangotri- 574 199, India
²Radiochemistry Division, ³Nuclear Physics Division, BARC, Mumbai- 400085, India
⁴Department of statistics, Manipal University, Manipal-576 104, Karnataka, India
⁵Department of Physics, University of Pune, 411 007, India
⁶Reactor Physics Design Division, BARC, Mumbai- 400 085, India

Abstract:

The 232Th(n, γ)233Th reaction cross-section at average neutron energy of 8.04 ± 0.3 MeV has been determined for the first time using activation and off–line γ –ray spectrometric technique. The 232Th(n, 2n)231Th reaction cross-section at the above neutron energy has also been determined using the same technique. The neutron flux with average neutron energy of 8.04 ± 0.3 MeV has been generated from 7Li(p, n) reaction at a proton energy of 10 MeV using BARC-TIFR Pelletron facility. The experimentally determined cross-sections were compared with the evaluated nuclear data of ENDF/B-VII and JENDL 4.0 and are found to be in good agreement. The 232Th(n, γ)233Th and 232Th(n, 2n)231Th reaction cross-sections were also calculated theoretically using TALYS 1.2 computer code and found to be in reasonable agreement with the experimental data.