

Fabrication and characterization of thin isotopic 144,154 Sm targets sandwiched between carbon layers

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Isotopic thin samarium (Sm) targets of 150-200 $\mu\text{g}/\text{cm}^2$ thickness have been fabricated in high vacuum(HV) environment by thermal evaporation method on carbon (C) backing of 20-25 $\mu\text{g}/\text{cm}^2$ thickness at Inter University Accelerator Centre (IUAC), New Delhi. Preparation and storage of lanthanide targets is quite challenging task as they are chemically very active. A very thin layer of C of thickness 5-10 $\mu\text{g}/\text{cm}^2$ has been evaporated on Sm using electron-gun bombardment technique to prevent it from oxidation. Set of more than twenty 144Sm and 154Sm targets each were successfully prepared in the target laboratory of IUAC, New Delhi. Characterization techniques like Rutherford back scattering (RBS), Alpha energy loss technique and Energy dispersive X-ray fluorescence (EDXRF) have been used to access the purity, thickness and elemental composition of targets. Thickness of these targets measured by using different techniques are in well agreement with each other. These targets have been successfully used in three nuclear physics experiments using the National Array of Neutron Detectors (NAND), HYbrid Recoil Mass Analyzer (HYRA) and General Purpose Scattering chamber (GPSC) at IUAC.

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