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**Creation of Thin Deuterated Polyethylene Targets for Inverse Kinematics Transfer Reaction Measurements** K.D. LONG, R.L. KOZUB, Tenn. Tech. U., B. MANNING, Rutgers U., S.D. PAIN, C.D. NESARAJA, M.S. SMITH, D.W. BARDAYAN, ORNL — Transfer reactions are an important tool for the study of single-particle structure of nuclei. Such measurements have many applications to the field of astrophysics, such as study of the rapid neutron capture (r-) process that is believed to create heavy elements in supernovae. Measurements in inverse kinematics are necessary when studying transfer reactions on unstable nuclei with lifetimes too short to be used as targets. The measurement of deuteron-induced transfer reactions in inverse kinematics requires a target containing a significant quantity of deuterons, such as deuterated polyethylene ($(C_2D_4)_n$ or $CD_2$), which can be fabricated into thin foils by dissolving $CD_2$ in xylene. A campaign is underway at ORNL to measure (d,p) reactions with unique heavy fission fragment beams. For such measurements, thin targets are favored to minimize peak broadening in the energy spectra of emitted particles. Emphasis has been placed on creation of targets of $\sim$70 $\mu$g/cm$^2$ thickness, significantly thinner than previously used at ORNL. Improvements, such as careful control of the temperature of slides covered by the $CD_2$/xylene solution, have been developed to produce such targets. Details will be presented. This research is supported by the Office of Nuclear Physics in the U. S. Department of Energy.

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