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Metal Oxide Films Produced by Polymer-Assisted Deposition (PAD) for Nuclear Science Applications MAZHAR ALI, MITCH GARCIA, NOEL CHANG, TASHI PARSONS-MOSS, JACKLYN GATES, UC Berkeley, PAUL ASHBY, LIV STAVSETRA, KENNETH GREGORICH, Lawrence Berkeley National Lab, HEINO NITSCHE, UC Berkeley — The preparation of homogenous metal oxide films (100 to 750 nm) is of interest to nuclear science for use as targets in nuclear reactions. Metal oxide targets, prepared for nuclear science applications, are conventionally made by molecular plating. However, the method suffers from poor adhesion to the backing material and lacks homogeneity at target thicknesses less than about 300 nm. Polymer-assisted deposition (PAD) produces crack-free homogeneous metal oxide films with uniform thicknesses between 20 and 400 nm and was investigated as a new method for preparing targets. Metal oxide films of europium, thulium, and hafnium were prepared as models for actinide oxides. Films produced by a single application of the PAD method were homogenous and uniform and ranged in thickness from 30 to 320 nm. Targets were then prepared on silicon nitride backings (thickness of 1000 nm) and were irradiated with an 40Ar beam at a laboratory frame energy of approximately 210 MeV. Atomic force microscopy and scanning electron microscopy of the irradiated target reveals no significant difference in surface homogeneity when compared to imaging prior to irradiation. Future plans with the PAD method will also be presented.

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