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Using Thin Films to Rapidly Screen Potential Scintillators BRIAN MILBRATH, Pacific Northwest National Laboratory, JAC CAGGIANO, DEAN MATSON, LARRY OLSEN — Growing crystals of inorganic scintillators is a time-consuming and expensive process, slowing the discovery of new radiation detection materials. To that end, we have begun an investigative program to discern the usefulness of thin polycrystalline films for scintillator characterization. As a first step, we made 10 micron thick films of Eu-doped CaF_2 by electron beam deposition, which took approximately 1.5 hours per sample. After confirming composition with XPS and crystal structure with GIXRD, photoluminescence measurements were performed and found to be in agreement with literature values. Photopeak comparisons can be performed using alpha sources. The method provides a quick way to explore and optimize the proper dopant amount. The crystal structure of the thin films results in grain sizes of approximately 15 nm. Light yields were approximately 10% of those found in commercial, single-crystal materials. Recently, we have begun to make thin Ce halide films. Rare-earth halide scintillators are an area of much current activity due to the favorable energy resolutions and light yields some of them possess. Preliminary results from our Ce halide studies will be presented along with our CaF_2(Eu) results.

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