

Improving Background Suppression in LEGEND with the Novel Scintillating Material, PEN

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Identification of background radiation is of utmost importance for enabling rare event experiments. The Neutrinoless double beta decay experiment LEGEND, utilizes background suppression to reach sensitivities of $T_{1/2} > 10^{28}$ yrs with the isotope ^{76}Ge . Poly(ethylene-2,6-naphthalate) (PEN) has emerged as a highly promising material for LEGEND due to its intrinsic scintillating properties and its structural behavior at both room and cryogenic temperatures.

PEN has been successfully implemented in the LEGEND-200 experiment as both an active material and a structural component within the detector assembly. Looking towards the next-generation experiment, LEGEND-1000 will further reduce background radiation to $<10^{-5}$ cts/(keV kg yr). To achieve this goal, we are looking to produce custom PEN-G and expand potential applications to further improve background radiation identification. In this presentation, we will present the optical properties and radiopurity of custom synthesized PEN, and potential impact on applications in LEGEND-200 and LEGEND-1000.

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Poster prize

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