

Abstract Submitted
for the DNP19 Meeting of
The American Physical Society

Active Structural Materials for Low Background Experiments¹

BRENNAN HACKETT, University of Tennessee, MICHAEL FEBBRARO, DAVID RADFORD, Oak Ridge National Laboratory, DANIEL MUENSTERMANN, University of Lancaster, BELA MAJOROVITS, OLIVER SCHULZ, Max Planck Institute of Physics, MICHELLE KIDDER, BRENT DIAL, ALFREDO GALINDO-URIBARRI, Oak Ridge National Laboratory — Progress in the field of neutrino physics, including searches for neutrinoless double beta decay ($0\nu\beta\beta$) and neutrino oscillation measurements, places extreme demands for ultra-low background sensitivities. These improvements can be achieved by replacing inactive structural components with transparent, radio-pure plastic scintillators. These structural scintillating components surround the detector with a low background material and serve as an active veto, discriminating internal events of interest from external background events. Poly(ethylene-2,6-naphthalate) (PEN) has been identified as an ideal material for structural scintillator components as it has a significant yield strength and scintillates in the 400 nm region. A synthesis method has been developed to optimize optical properties and limit exposure to radio-impurities. This presentation will provide an update on the synthesis and characterization of PEN and PEN derivatives, as well as provide examples of applications for future ton-scale $0\nu\beta\beta$ experiments.

¹*This material is based upon work supported by the U.S. D.O.E, Office of Science, Office of Nuclear Physics. Research sponsored by the Laboratory Directed Research and Development Program of Oak Ridge National Laboratory, managed by UT-Battelle, LLC, for the U.S. D.O.E.

Brennan Hackett
University of Tennessee

Date submitted: 01 Jul 2019

Electronic form version 1.4