Abstract Submitted
for the APR20 Meeting of
The American Physical Society

Active Structural Materials for Low Background Experiments[1]
BRENNAN HACKETT, University of Tennessee, Oak Ridge National Laboratory, MICHAEL FEBBRARO, Oak Ridge National Laboratory, YURI EFREMENKO, University of Tennessee, Knoxville — Progress in the field of low background physics, including searches for neutrinoless double beta decay ($0\nu\beta\beta$) and for dark matter, places extreme demands for ultra-radio pure technologies. Improving the background sensitivity can be achieved by replacing inactive structural components with transparent, radio-pure plastic scintillators. The 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 proposed application of this material 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.

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Date submitted: 10 Jan 2020 Electronic form version 1.4