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Plastic Organic Scintillator Chemistry C. R. BRIGHTWELL, Tennessee Technological University, E. S. TEMANSON, University of Wisconsin-La Crosse, M. T. FEBBRARO, Oak Ridge National Laboratory — Due to their high light output, quick decay time, affordability, durability and ability to be molded, plastic organic scintillators are increasingly becoming a more viable method of particle detection. Since the plastic is composed entirely of single molecular chains with repeating units, scintillating properties remain stable despite changes in experimental conditions. Different scintillating plastics can be modified and tailored to suit specific experiments depending on a variety of requirements such as light output, scintillating wavelength, and PMT compatibility. The synthesis chemistry of a recent but well-known scintillating polyester, polyethylene naphthalate (PEN) will be presented to demonstrate how plastic organic scintillators can be modified for different particle detection experiments. PEN has been successfully synthesized at ORNL, and procedures are currently being investigated to modify PEN using different reactants and catalysts. The goal is to achieve a transparent scintillating plastic with an incorporated wavelength shifter in the chain that scintillates with a wavelength around 440 nm. The status of this project will be presented. This research is supported by the U. S. Department of Energy Office of Science.

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