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Performance Studies of PEN and TPB as UV Wavelength Shifting Coatings in Liquid Argon

Tetraphenyl Butadiene (TPB) has been employed as a wavelength shifting coating in LArTPCs, thanks in part to its efficiency at 128 nm. However, recent studies of TPB's stability in liquid argon found detectable concentrations of TPB after periods of only 24 hours and the dissolved TPB was shown to produce a wavelength shifting effect in the argon bulk. Here, we study the stability and performance of Polyethylene Naphthalate (PEN) as an alternative coating, while also repeating measurements with TPB for comparison. The relative wavelength shifting efficiency of the two materials was compared and sample emanation studies from each coating are ongoing, quantified by fluorescence assay of molecular sieve filter material after a prolonged soak time.

Mini-abstract

PEN and TPB were compared for wavelength shifting efficiency and emanation effects in liquid argon.

Primary author: DORRILL, Ryan

Presenter: DORRILL, Ryan

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