

## Accepted Manuscript

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PII: S0168-9002(18)30126-8  
DOI: <https://doi.org/10.1016/j.nima.2018.01.093>  
Reference: NIMA 60519

To appear in: *Nuclear Inst. and Methods in Physics Research, A*

Received date : 11 January 2018  
Revised date : 27 January 2018  
Accepted date : 28 January 2018

Please cite this article as: N. Zaitseva, A. Glenn, A. Mabe, L. Carman, C. Hurlbut, J. Inman, S. Payne, Recent developments in plastic scintillators with pulse shape discrimination, *Nuclear Inst. and Methods in Physics Research, A* (2018), <https://doi.org/10.1016/j.nima.2018.01.093>

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## Recent developments in plastic scintillators with pulse shape discrimination

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**Abstract.** The paper reports results of studies conducted to improve scintillation performance of plastic scintillators capable of neutron/gamma pulse-shape discrimination (PSD). Compositional modifications made with the polymer matrix improved physical stability, allowing for increased loads of the primary dye that, in combination with selected secondary dyes, provided enhanced PSD especially important for the lower energy ranges. Additional measurements were made with a newly-introduced PSD plastic EJ-276, that replaces the first commercially produced EJ-299. Comparative studies conducted with the new materials and EJ-309 liquids at large scale (up to 10 cm) show that current plastics may provide scintillation and PSD performance sufficient for the replacement of liquid scintillators. Comparison to stilbene single crystals complements the information about the status of the solid-state materials recently developed for fast neutron detection applications.

**Keywords:** Pulse shape discrimination; Neutron detection; PSD plastic; Organic scintillator; Stilbene crystal

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