Fluorescence yield for plastic scintillators after radiation

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Abstract

The fluorescence yield versus wavelength for plastic scintillators EJ-408 and EJ-260 for doses of 50, 30, 10, 4, and 2 Mrad from a ^{60}Co source at various dose rates and for different concentrations of the primary and secondary dopant. While the nominal dopant concentration gives the highest light output prior to irradiation, a higher concentration is found to be optimal for irradiated plastics.

Keywords: plastic scintillator, fluorescence, radiation hardness,

1. Introduction

Organic scintillators (such as toluene, polystyrene, and naphthalene) containing wave-length shifting additives in solution have long been popular elements in detectors used in particle physics, nuclear physics, radiation safety, and heath physics applications due to their high light output, low cost, fast response, and versatility of physical construction. Plastic scintillators and wavelength shifters, including wavelength shifting fibers, are currently available from companies such as St. Gobain [1], Kuraray [2], and Eljen [3]. Prolonged exposure of plastic scintillator to ionizing radiation has harmful effects: it can increase light self-absorption (yellowing) and decrease initial light yield.

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2. Results

3. Conclusions

4. Acknowledgements

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References

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