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#07-5 Plastic Scintillators With Tunable Decay Time

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Due to their nature plastic scintillators are widely used in industrial applications as well as in research and scientific fields. In the field of nuclear physics, plastic scintillators show favourable properties such as possibility to be prepared in large volumes and different sizes and shapes; they are cheap, efficient and can be easily modified. Standard plastic scintillators are available with relatively short decay times usually in the range of 0.7-10 ns and then only with long decay time of 285 ns. For certain applications, however, scintillators with unusual decay times may be required. The work presented proposes a new concept where the scintillation decay time can be finely chosen and tuned in a range starting at 2.5 ns and finishing around 90 ns. Plastic scintillator compositions were modified to include two molecules, both serving as primary fluorophores with strongly different photoluminescence decay times. The relative concentration of the two molecules then led to materials with different decay times. Secondary fluorophore (shifter) had only little impact on the material decay time and it was changed to obtain scintillation material emitting in blue (420 nm), green (500 nm) or red (560 nm) wavelength region. These materials were synthesized, characterized and results are presented.

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