

Synthesis and Characterization of New Plastic Scintillators for Fast Timing Detectors

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Plastic Scintillators are materials made up by organic molecules (primary dopant) and eventually by wave shifters (secondary dopant) dissolved in a polymeric matrix such as polystyrene (PS) or polyvinyltoluene (PVT). Due to their capability to obtain very good time resolutions, together with the low cost and the flexibility in manufacturing, these detectors are used in many different applications such as national security, medical imaging, radiation detection, environmental monitoring and many others. In this research project new organic molecules have been synthesized as primary dopants by Laboratory of Electrochemistry and Organic Synthesis (LEOS) in order to develop a new class of plastic scintillators for fast timing detectors. The obtained results from cosmic ray detection experiments carried out by physicists and engineers of Sapienza University of Rome and Centro Studi e Ricerche Enrico Fermi, were compared with those obtained using the commercial detector EJ-200 (Eljen Technology) showing in some cases similar performances in terms of light output and better in terms of response rates.