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PAPER TITLE RADIATION DAMAGE AND PROTECTION OF PLASTIC SCINTILLA-
TORS WITH A BASE OF POLYSTYRENE AND EPOXYPOLYMERS

AUTHOR(S) NAME(S) N.Barashkov, F.Markley, A.Pla-Dalmau, G.Foster,
M.Rivard

SUBMITTING AUTHOR

LAST NAME Barashkov FIRST NAME Nikolay TITLE Doctor
AFFILIATION University of Texas at Dallas TEL (214)883-2671
STREET 2601 North Floyd Road FAX (214)883-2905
CODE 75080 CITY Richardson, Texas COUNTRY USA

PRESENTING AUTHOR (IF DIFFERENT)

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RADIATION DAMAGE AND PROTECTION OF PLASTIC SCINTILLATORS WITH A BASE OF POLYSTYRENE AND EPOXYPOLYMERS. N.Barashkov¹, F.Markley², A.Pla-Dalmau², G.Foster², M.Rivard³ 1) University of Texas at Dallas, Richardson, TX 75083-0688, USA; 2) Fermi National Accelerator Laboratory, Batavia, IL 60510, USA; 3) University of Michigan, Ann Arbor, MI 48109-1200, USA
Plastic scintillators are often used in dosimetry of ionising radiation at high and low levels. Some experiments in high energy physics such as modern colliding beam experiments subject scintillators to higher doses of radiation than ever before. Plasticizers (diffusion enhancers) have been used to provide the radiation protection of scintillators. We have shown that the introduction of plasticizers in common polymer matrix has at least two disadvantages. These consist of making the scintillators too soft and increasing the probability of diffusion of the scintillation dyes out of the matrix. Two new approaches for the preparation of scintillators with improved radiation stability have been investigated. The first approach consists of preparing crosslinked copolymers of styrene or epoxypolymers which can be used as the matrix with a large concentration of plasticizers. The second approach eliminates any luminophore migration by covalent bonding of the scintillation dyes into the polystyrene and epoxypolymers. We investigated the dependence of the radioluminescence intensity of these new scintillators on the concentration of the macroradicals formed in the process of gamma-irradiation.