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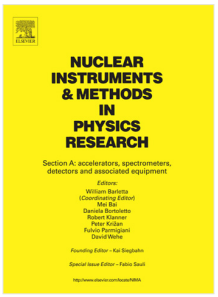

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Improved light output of plastic scintillator by a modified self-assembled photonic crystal

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Abstract: In this investigation, we have demonstrated that a modified self-assembled photonic crystal with conformal high refractive index material TiO_2 can achieve a great enhancement of light extraction efficiency. A 2.26 fold wavelength- and angle-integrated enhancement ratio can be achieved. The conformal layer increases the number of leaky modes and thus improve the extraction efficiency. The enhancement is attributed to the leaky modes based on the individual microspheres with conformal layer. Their low quality factors with a broadband characteristic are advantageous to the broadband enhancement for the emission spectra of plastic scintillator. Furthermore, the dense conformal layers have excellent combination with the self-assembled microspheres and the whole preparation process cannot destroy the plastic scintillator, which is beneficial to the practical application.

Keywords: plastic scintillator; photonic crystal; self-assembly; atomic layer deposition

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