

(Research Article ☺)

Modification induced by gamma irradiation in polystyrene/poly(methyl methacrylate) blends;

Authors: S.A. Nouh; K. Benthami; A. Abou Elfadl; Huda A. El-Nabarawy;

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The influence of gamma irradiation on the structural and optical properties of polystyrene/poly(methyl methacrylate) (PS/PMMA = 50/50 w/w %) blend films have been investigated. A dose range of 20 kGy to 400 kGy is covered. Applying the viscometry technique, the dose dependence of the intrinsic viscosity was investigated. In addition, the variation of refractive index with gamma dose was studied. The observed increase in the intrinsic viscosity from 0.45 up to 0.69 and the refractive index in the high dose range indicates that the predominant induced process by gamma irradiation is crosslinking, which reduces the free volume and increases the average molecular weight leading to a more compact structure of PS/PMMA samples. Fourier Transform Infrared (FTIR) and ultraviolet-visible (UV-VIS) spectroscopies were applied to identify the chemical structure and to investigate the major process that is induced by irradiation. Moreover, using UV-vis spectroscopy, optical energy gap, Urbach energy and color changes were evaluated. The results reveal that the optical energy gap has arisen from direct transitions. The color intensity DE was significantly decreased with increasing the dose up to 400 kGy.