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ABSTRACT

This paper is devoted to study the defects generated by reactor neutron in polyethylene terephthalate (PET) films. The explored fast neutron fluence ranges from 2.02×10^{16} to 2.07×10^{18} n cm⁻². The induced damages were investigated using ultraviolet-visible spectrophotometry (UV-vis), Fourier Transform Infrared spectrometry (FTIR) and X-ray diffraction (XRD). The UV-vis spectra show important changes indicating the degradation of the chemical structure and the creation of new chromophores. FTIR spectra reveal that the intensities of the different absorption bands decrease linearly under fast neutron irradiation. The internal reference band at 1410 cm⁻¹ is used to follow the overall damage during irradiation. The 1342 cm⁻¹ band corresponding to CH₂ wagging of trans conformation of crystalline phase show a sharpe linear decrease as the fast neutrons fluence goes up. The creation of the monosubstituted benzene, investigated using the 1610 cm⁻¹ band. It shows a linear increase with fast neutron fluence. It is found from XRD analysis that the diffraction peak (100) intensity is drastically reduced after irradiation at 2.02×10^{16} ncm⁻².

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