Study of Polymeric Luminescent Blend (PC/PMMA) Doped with Europium Complex under Gamma-Iradiation

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Spectroscopic properties of blends formed by bisphenol-A polycarbonate (PC) and poly(methyl methacrylate) (PMMA) doped with europium(III) in organic complex were studied. Polymeric luminescent blends are potential materials for many applications; however, little information has been reported concerning the stability under thermal and radiation conditions. Luminescent films were synthesized from europium (III) thenoyltrifluoroacetonate at different concentrations doped in PC/PMMA blends. Films produced of the luminescent polymer blend were irradiated in a ^{60}Co source. Their luminescent properties, in the solid state, as well as, the thermal oxidative resistance after gamma irradiation was investigated. These systems were characterized by elemental analysis, thermogravimetry (TGA), differential scanning calorimetry (DSC) and infrared spectroscopy (FTIR). Based on TGA data, the thermal stability of PC/PMMA:$(tta)_3$ system is higher than the polymer blend. The DSC results indicated that those new systems are chemically stables. The emission spectra of the Eu^{3+}-tta complex doped in the PC/PMMA recorded at 298 and 77K exhibited the characteristic bands arising from the $^5D_0 \rightarrow {}^7F_J$ transitions (J = 0-6). The luminescence intensity decreases with increasing of precursor concentration in the doped polymer obtained by chemical reaction. This result is different from that of samples obtained by physical method in melting doping. The blend was irradiated under ionizing radiation of ^{60}Co source.

After irradiation of the luminescent films the physical properties of luminescence, thermal and oxidative stability were evaluated.(Fapesp and Cnpq financial support)

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