

Luminescent polypropylene - strategy for Eu-doping in apolar polymer

D. F. Parra, L. G. Marchini, A. B. Lugão, M. C. Felinto

Institute of Energetics and Nuclear Researches, IPEN/CNEN-SP, Av. Prof. Lineu Prestes, 2242, CEP 05508000, São Paulo, SP, Brazil

* Corresponding author: dfparra@ipen.br

Researches and publications about luminescent polymers have been developed in the last years due the academic innovation¹; however the application is very limited at industrial area. Optical markers processed are few explored due the difficult to process this kind of luminescent materials. The materials used to obtain luminescent polymeric material doped with europium complex was [Eu(tta)₃(H₂O)₂]. Polyolefin are apolar, inert under common process of doping, because of this, luminescent polypropylene was indirectly prepared by polymeric matrix doped with europium complex/poliamide of casting process. Material characterization was done using Thermalgravimetric analysis (TG), Differential Scanning Calorimetry (DSC), X-Ray Diffraction (XRD), Infrared spectroscopy (FTIR) and spectrofluorescence of emission and excitation. The blended optical marker Pol:Eu(tta)₃ has luminescent properties as observed in the narrow bands of intraconfiguration transitions– 4f⁶ relatives to energy levels ⁷F₀ → ⁵L₆ (394nm), ⁷F₀ → ⁵D₃ (415nm), ⁷F₀ → ⁵D₂ (464nm), ⁷F₀ → ⁵D₁ (525nm) e ⁷F₀ → ⁵D₀ (578nm) of emission spectrum. Red light of the pellets or films is emitted when the materials are exposed in UV lamp (365nm). In this work was possible to process luminescent polypropylene:Eu optical marker with thermal and photo stability properties adequate to use as optical marker in extrusion process.

Keywords: luminescent polymers, trivalent rare earth, extrusion double-screw, polymeric optical marker

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