PB267- PHOTOLUMINESCENT STUDY OF POLYMERIC SYSTEM BASED ON RARE EARTH β-DIKETONATE CROWN COMPLEXES AND POLYMETHYLMETACRYLATE FILM

A Verloza[1], C A Kodaira[1] M C F. C. Felinto[1] and H F. Brito[2]
[1] *Instituto de Pesquisas Energéticas e Nucleares , São Paulo, SP, Brazil*
[2] *Instituto de Química - Universidade de São Paulo São Paulo, SP, Brazil*
e-mail:mfelinto@ipen.br

Luminescent materials containing trivalent rare earth (RE^{3+}) complexes with β-diketonate ligands have been intensively studied in recent years. The RE^{3+} compounds present characteristic narrow emission bands in the UV-Vis region, large Stokes shift and the antenna effect that enhance the overall quantum efficiency, As a result, these complexes have found wide applications as luminescent markers, photoluminescent sensors, electroluminescence devices, and multicolor display. In this work, we report the luminescent properties and thermostability of polymethylmetacrylate (PMMA) doped with Eu^{3+} crown β-diketonates complexes which present an interesting luminescent behavior.

The $[Eu(tta)_3{\cdot}(H_2O)_2]$ and $[Eu(tta)_3{\cdot}(DB18C6)]$, complexes were synthesized and characterized by elemental analysis, IR thermal analyses and photoluminescent techniques. The films were prepared by dissolving the PMMA, PEG 300 and 400 polymers in acetone and mixing of Eu^{3+} complexes acetone solution and dried at 60 °C. The thermostability of the polymer systems was investigated by thermogravimetric analysis (TGA). The excitation and emission spectra of the polymeric systems were recorded at room temperature. Fig.1 shows the excitation and emission spectra at 298K of PMMA film doped with $[Eu(tta)_3{\cdot}(DB18C6)]$.

The PMMA polymer doped with Eu^{3+} complexes exhibits -red color when excited at UV radiation. The photoluminescent behavior of this system shows the intraconfigurational transitions arising from $^5D_0 \rightarrow {}^7F_J$ transitions (J=0-4) of Eu^{3+} ion. This system acts as efficient light conversion molecular devices (LCMD) based on rare earth complexes doped in polymer.

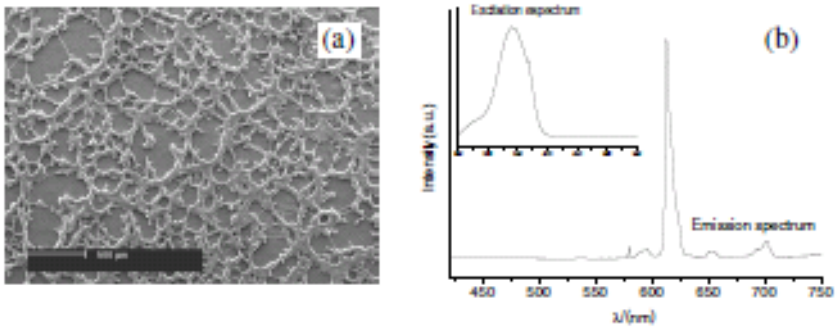

Figure 1. SEM (a) and emission and excitation spectra (b) of polymeric film.