

# Synthesis and characterization of encapsulation of silver nanoparticles with luminescent methyl polymethacrylate (PMMA)

Reference	Presenter	Authors (Institution)	Abstract
03-080	Duclerc FERNANDES PARRA	PARRA, D.F. (INSTITUTO DE PESQUISAS ENERGETICAS E NUCLEARES); Lima, V.d. (Instituto de Pesquisas Energéticas e Nucleares); Lugao, A.B. (IPEN); Cotrim, M.H. (Instituto de pesquisas energéticas e nucleares);	<p>Rare earths have improved their importance owing to optical properties not only in the research area, but also in industrial and technological areas. Due to its higher luminescent intensity, <math>\text{Eu}^{3+}</math> complexes are among the most studied rare earth complexes that present luminescence, due to the structures of their energy levels. Combination with high molar absorptive ligands can promote a high emission of the <math>\text{Eu}^{3+}</math> ions. The present study concerns luminescent doped polymers from methyl polymethacrylate (PMMA) used as a matrix for the development of luminescent films. The rare earth complex <math>[\text{Eu}(\text{tta})_3(\text{H}_2\text{O})_2]</math> was synthesized and used as a precursor for the synthesis of the secondary complex <math>[\text{Eu}(\text{tta})_3(\text{TPPO})_2]</math>. Silver nanoparticles synthesized and encapsulated in luminescent polymeric system showed distinct luminescence behavior in the presence of those nanoparticles. After synthesis, the films were characterized. Investigation of the thermal behavior used differential exploratory calorimetry (DSC) and thermogravimetric analysis (TGA) techniques. The characteristic fine emissions of the metal ion from the <math>5D_0 \rightarrow 7F_J</math> transitions (<math>J = 0-4</math>) indicated the incorporation of <math>\text{Eu}^{3+}</math> ions from both complexes in the matrix. The films showed the increase of the luminescence intensification of secondary complex in relation to the precursor complex. When encapsulating the silver nanoparticles to the luminescent systems, the luminescence intensity of these materials increased under conditions of low concentrations of the complex</p>