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# Synthesis and Photoluminescence Behavior of the PMMA Films Doped with [Eu(TTA)<sub>3</sub>(*N*-picNO)<sub>2</sub>] Complexes

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Over the past three decades, trivalent rare earth (RE<sup>3+</sup>) β-diketonate complexes have attracted much attention due to their intrinsic spectroscopic properties and applications as luminescent materials [1]. By incorporating luminescent RE<sup>3+</sup>-complexes in the polymer matrix, the resulting product represents not only the sum of individual contributions of both organic and inorganic phases, but also novel properties for a new class of materials. In this work, we synthesized and characterized three complexes of europium-2-tenoyltrifluoroacetate and *N*-picoline- *N*-oxide ligands that doped the produced films. The doped PPMA polymer films (polymethyl methacrylate) with the Eu<sup>3+</sup>-complexes were prepared by the spilling method. The complexes [Eu(TTA)<sub>3</sub>(*N*-picNO)<sub>2</sub>] (N = 2, 3 and 4) and the films were characterized by elemental analysis, infrared, thermal analysis and X-ray diffraction techniques. The films presented crystalline behavior as the PMMA matrix and a greater resistance to the temperature. Photoluminescence properties were investigated based on the spectroscopic data obtained for the complexes and polymer films. It is observed in the excitation and emission spectra of the luminescent polymeric systems narrow bands originated from the characteristic intraconfigurational 4f-4f transitions, indicating efficient intramolecular energy transfer from the organic moiety to the RE<sup>3+</sup> ions. The β-diketonate ligands act as effective sensitizers for the luminescent centers and the resulting polymeric films doped with Eu<sup>3+</sup> complexes present strong red emission. The experimental intensity parameters and emission quantum efficiencies of Eu<sup>3+</sup> luminescent materials were determined and discussed.

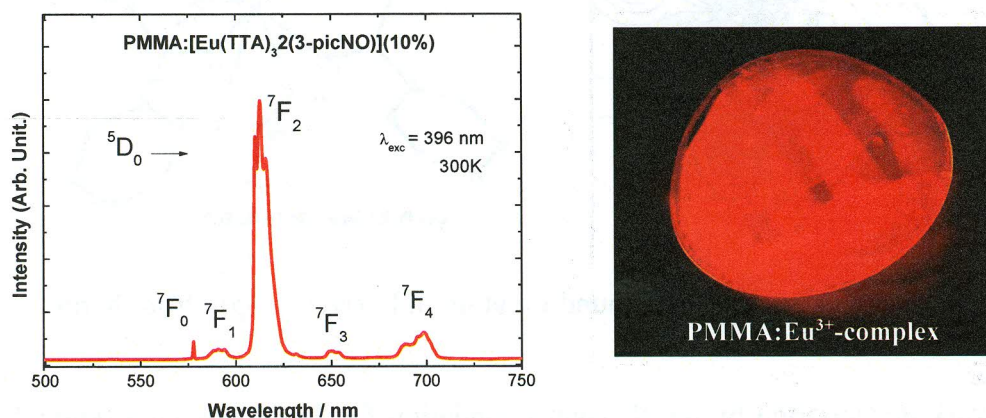


Fig.1. Emission spectrum (left) and picture (right) of the PMMA:[Eu(TTA)<sub>3</sub>(*N*-picNO)<sub>2</sub>](10%).

## References

- (1) J. Kai, M.C.F.C. Felinto, L.A.O. Nunes, O.L. Malta, H.F. Brito. J. Mater. Chem. 21 (2011) 3796-3802.