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**BOOK OF ABSTRACTS**

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## MOLTEN LIGAND SYNTHESIS METHOD AND LUMINESCENCE STUDY OF RE<sup>3+</sup> COMPLEXES WITH PIMELATE

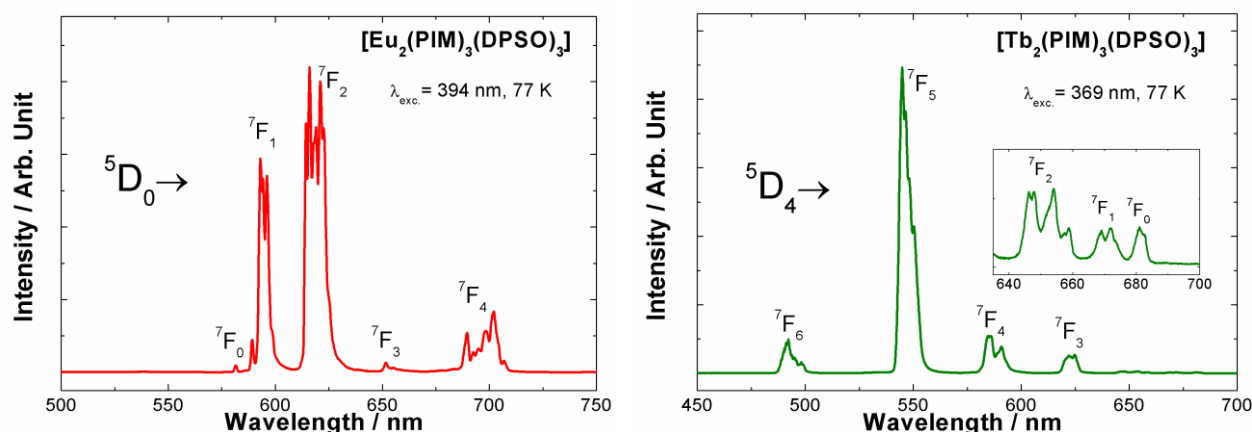
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For decades, the rare earth ions (RE<sup>3+</sup>) luminescent complexes have attracted much interest due to their intrinsic spectroscopic behavior and commercial applications in different areas such as: organic light-emitting diodes (OLEDs), luminescent security inks, sensors, optical markers, *etc* [1]. This work presents the molten ligand synthesis method of RE<sup>3+</sup> complexes, characterization and luminescent properties of the [RE<sub>2</sub>(PIM)<sub>3</sub>(DPSO)<sub>3</sub>] compound where RE: Eu<sup>3+</sup> and Tb<sup>3+</sup>; PIM: pimelic acid (heptanedioic acid) and DPSO: diphenyl sulfoxide. The lanthanides complexes were synthesized by molten ligand solid state method using the rare earth chloride and the PIM and DPSO ligands, which have the advantage of present low melting points at around 104 and 70 °C, respectively. The RE<sup>3+</sup> complexes were characterized via elemental analysis (CHN), thermal analysis coupled with mass spectrometry (TG/MS), x-ray diffraction by the powder method (XPD) and infrared spectroscopy (FTIR). The infrared absorption spectra indicate that the ligand-metal interaction is via chelate-bridging and their XPD patterns suggest high crystallinity and that the complexes present isomorphic character. The principal photoluminescence properties were determined based on the emission spectra of the Eu<sup>3+</sup> (Fig. 1, left) and Tb<sup>3+</sup> (Fig. 1, right) complexes, showing a highly intense red and green emission colors, under UV excitation at 394 and 369 nm, respectively. Moreover, the spectra show narrow emission bands characteristic of the <sup>5</sup>D<sub>0</sub>→<sup>7</sup>F<sub>0-4</sub> transitions of the Eu<sup>3+</sup> and the <sup>5</sup>D<sub>4</sub>→<sup>7</sup>F<sub>6-0</sub> transitions of Tb<sup>3+</sup> ion. The absence of the broad emission band from the triplet states (T<sub>1</sub>) of the organic ligands in the spectral range from 400 to 600 nm is also consistent with an efficient ligand-to-metal intramolecular energy transfer to the emitting levels of Eu<sup>3+</sup> and Tb<sup>3+</sup> in the complexes [2]. The emission quantum efficiency of <sup>5</sup>D<sub>0</sub> level and the 4f–4f experimental intensity parameters of the Eu<sup>3+</sup> ion will be discussed.



**Fig. 1 - Emission spectra of [Eu<sub>2</sub>(PIM)<sub>3</sub>(DPSO)<sub>3</sub>] (left) and [Tb<sub>2</sub>(PIM)<sub>3</sub>(DPSO)<sub>3</sub>] (right) complexes recorded at low temperature.**

[1] J.-C.G. Bunzli, C. Piguet, *Chem. Soc. Rev.* 34 (2005) 1048-1059.

[2] E. R. Souza, I. G. N. Silva, E. E. S. Teotonio, M.C.F.C. Felinto, H.F. Brito *J. Lumin.* 130 (2010) 283-291.