

Molten Ligand Synthesis Method And Luminescence Study Of RE^{3+} Complexes With Glutarate

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MOLTEN LIGAND SYNTHESIS METHOD AND LUMINESCENCE STUDY OF RE^{3+} COMPLEXES WITH GLUTARATE

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This work presents the molten ligand synthesis method of RE^{3+} complexes, characterization and luminescent properties of the $[\text{RE}_2(\text{GLU})_3(\text{DPSO})_3]$ compound where RE: Eu^{3+} and Tb^{3+} ; GLU: glutaric acid and DPSO: diphenyl sulfoxide. The lanthanides complexes were synthesized by molten ligand solid state method using the rare earth chloride and the GLU and DPSO ligands, which have the advantage of present low melting points at around 98 and 70 °C, respectively.

The principal photoluminescence properties were determined based on the emission spectra of the Eu^{3+} and Tb^{3+} 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 $^5\text{D}_4 \rightarrow ^7\text{F}_{0-4}$ transitions of the Eu^{3+} and the $^5\text{D}_4 \rightarrow ^7\text{F}_{6-0}$ transitions of Tb^{3+} ion. The absence of the broad emission band from the triplet states (T_1) 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^{3+} and Tb^{3+} in the

complexes [1]. The emission quantum efficiency of 5D level and the 4f–4f experimental intensity parameters of the Eu^{3+} ion will be discussed.

References

- [1] 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.