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Photoluminescence properties and thermal investigation by TG-MS of RE(DAS)₃·xH₂O, [RE = Eu³⁺, Tb³⁺]

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The complex rare earth diphenyl-4-amine sulfonate RE(DAS)₃·xH₂O RE = [Eu³⁺, Tb³⁺] were synthesized by precursor method and characterization by photoluminescence (PL), FTIR, TG-MS, DRX and SEM. The luminescence spectra of Eu(DAS)₃·7H₂O and Tb(DAS)₃·2H₂O complexes were measured at room temperature, and the thermoanalytical study was performed in dynamic air atmosphere, using TG-MS technique. The thermal investigation shows that in dynamic air atmosphere, the oxysulfates Eu₂O₂SO₄ and Tb₂O₂SO₄ were obtained at approximately 973 K from the thermal decomposition of Eu(DAS)₃·7H₂O and Tb(DAS)₃·2H₂O complexes, respectively. The PL of Eu(DAS)₃·7H₂O show emission spectrum with groups of narrow emission bands assigned to the 5D₀→7F_J transitions (where J = 0–4), dominated by the abnormal high intensity 5D₀→7F₄ one (685.2 and 692.8 nm), while the emission spectrum of Tb(DAS)₃·2H₂O complex shows narrow emission peaks with the most intense one at 545.4 nm due to 5D₄→7F₅ transition. In this currently work, the FTIR, DRX, MEV, thermal investigation TG/DTG/MS and photoluminescent properties was applied in the characterization and study of RE(DAS)₃·H₂O RE = [Eu³⁺, Tb³⁺] complexes.

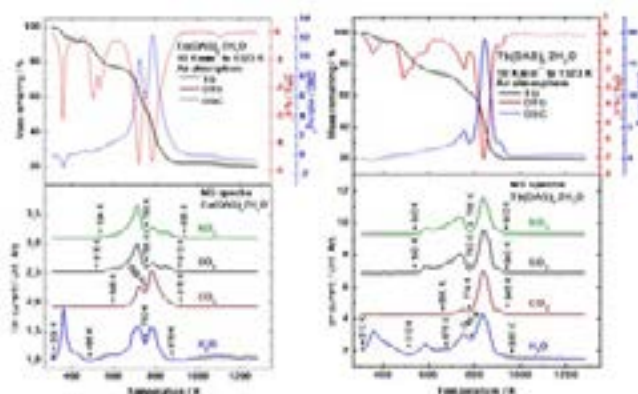


Figure 1 - TG/DTG/DSC curves and MS spectra of a) Eu(DAS)₃·7H₂O and b) Tb(DAS)₃·2H₂O complexes

Biography

Rodrigo Rodrigues It develops materials using the TG/DTG/DSC Thermal Analysis Techniques and TG/MS in the part of obtaining and characterizing the application of thermogravimetry to obtain nanomaterials and luminescent materials, studying kinetic methods (Ozawa) in determining the time of life of compounds. And in the study of photoluminescence applications of the excitation and emission spectra of the luminescence of rare earth elements RE. Has work with collaborations of São Paulo University USP – Brazil, Turku University – Finland and Institute of Low Temperature of Wrocław – INTIBS – Poland

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