

$\text{Y}_2\text{O}_2\text{SO}_4:\text{Eu}^{3+}$ Nanomaterials Synthesis by a Benzenecarboxylate Method

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Luminescent nanomaterials have been mainly investigated in recent years because of significant differences in structure and performance from the bulk [1,2]. Most preparation methods of nanosized luminophores need high temperatures or complicated experimental procedures. Rare earth (RE) 5-Sulfoisophthalic acid complexes ($\text{RE}(\text{STMA})\cdot 4\text{H}_2\text{O}$) decompose to rare earth sulfates $\text{RE}_2\text{O}_2\text{SO}_4:\text{Eu}^{3+}$ in one step at low temperature, the compounds were annealed at 500, 600, 700, 800, 900 and 1000 °C [3]. This work reports a new low temperature preparation method of the $\text{Y}_2\text{O}_2\text{SO}_4:\text{Eu}^{3+}$ nanomaterials based on benzenecarboxylate method precursors.

TGA analyses (Fig. 1) show an event from 35 to 175 °C corresponding to the loss of 4 water molecules and only one decomposition event, from 490 to 670 °C (loss of organic moiety). The XRD confirms the obtainment of $\text{Y}_2\text{O}_2\text{SO}_4:\text{Eu}^{3+}$ materials without the presence of other phases up to 900 °C, after this temperature Rietveld refinement show formation of Y_2O_3 .

The excitation spectra (Fig. 2) exhibit the LMCT $\text{O}\rightarrow\text{Eu}$ band centered at 275 nm and the intraconfigurational 4f transitions of Eu^{3+} . The excitation spectra show similar features independently of the annealing temperature, with the presence of an extra low intensity broad band in the compounds annealed at 500 and 600 °C, owing to oxycarbonated. The emission spectra (Fig. 3) exhibit only the intraconfigurational 4f transitions of the Eu^{3+} ion, with the presence of transitions arising from the $^5\text{D}_J$ (J : 0, 1 and 2).

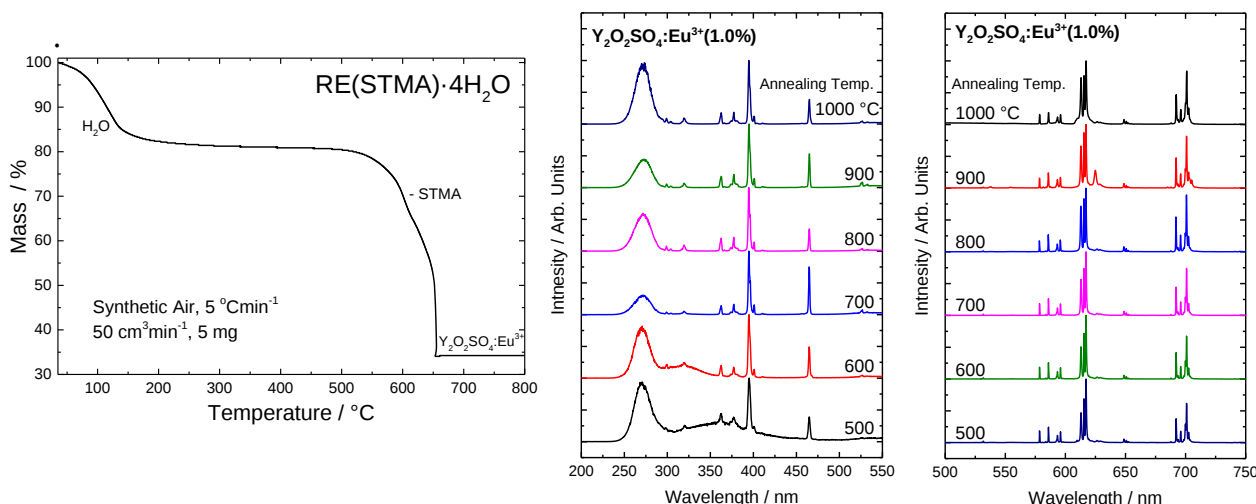


Fig. 1. Thermogravimetric analysis of $\text{Y}(\text{STMA}):\text{Eu}^{3+}$. **Fig. 2.** Excitation spectra of the $\text{Y}_2\text{O}_2\text{SO}_4:\text{Eu}^{3+}(1.0\%)$ materials, with emission monitored at 617 nm. **Fig. 3.** Emission spectra of the $\text{Y}_2\text{O}_2\text{SO}_4:\text{Eu}^{3+}(1.0\%)$ materials, with excitation at 275 nm.

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