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# YTTRIUM OXIDE AEROGELS CO-DOPED WITH EU3+;TB3+ AND FUNCTIONALIZED WITH TTA

Aerogels are very novel materials due to the large number of potential applications that the scientific community is currently investigating. This is due to their extreme porosity and the ability to be synthesized using a wide variety of compounds. Although the excellent thermal and acoustic properties of aerogels are guaranteed by the interconnection of their particles at the nano and micrometer scale, they have a large window of opportunity for their production and study from rare earth elements. Therefore, through the sol-gel process and supercritical drying with CO2, in this work yttrium oxide (Y2O3) aerogels co-doped with europium oxide (Eu2O3) have been synthesized at different concentrations (Eu3+= 2, 4, 8% mol) and terbium oxide (Tb2O3) in low concentration (Tb3+= 0.075 mol%). In this type of system, Eu3+ and Tb3+ act as luminescence-activating and sensitizing ions, respectively. The products were heat treated at 800 ℃ to obtain crystalline materials. Subsequently, thenoyltrifluoroacetone (TTA = 9 μmol%) was added to study the so-called "antenna"effect provided by this compound. The crystallized aerogels and TTA functionalized powders were characterized by infrared spectroscopy (FT-IR), x-ray diffraction (XRD), scanning electron microscopy (SEM), energy-dispersive x-ray spectroscopy (EDS) and by a luminescent analysis. (FL). The materials exhibit the characteristic bonding of rare earth metal oxides (M-O-M); with coralliferous morphologies that are associated with extremely porous materials. Furthermore, the interconnected particles presented a suitable chemical composition created from type-C crystalline structures with sizes less than 20 nm. Finally, luminescent studies revealed emission bands located between 480 and 650 nm associated with the 5D0⟶7F0-4 energy transitions characteristic of the red emission of the europium ion that was modified when functionalized with TTA. This type of materials has a high potential to be used in optoelectronics.

## Keywords

Rare earths, Sol-gel, Supercritical drying, Aerogels, Luminescence

## Reference

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