

## Synthesis, modification surface and characterization of tungstate/molybdate of zinc, doped with lanthanide ions [ $Zn_{1-x}RE_x(WO_4)_y(MoO_4)_z$ ] ( $y$ or $z = 0, 0.5, 1$ )

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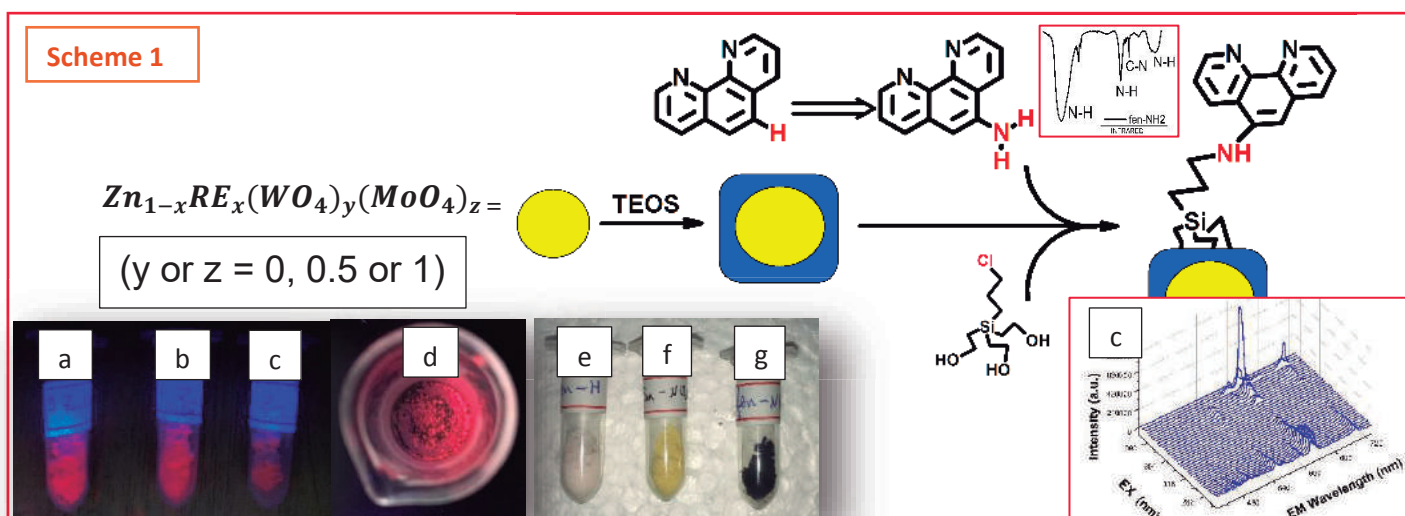
Palavras Chave: Europium, Terbium, Rare Earth, tungstates, molybdates,).

### Highlights

Was synthesized, using co-precipitation method, tungstates and molybdates of zinc doped with rare earth ions, and functionalized with phenantroline ligand for applications how luminescent sensors.

### Resumo/Abstract

A class of materials with the general formulation of  $M^I M^{III}(XO_4)_2$  ( $M^I$ =Alkali metal,  $M^{III}$  = trivalente metal and  $X = W$  or  $Mo$ ) with structural importance and diferente properties exposed to the attention of researchers, especially when doped with rare earth ions, which give the material luminescent properties. These properties can make the material promisingly important for diverse applications, such as solar cells, light converting devices and sensors, depending only on the changes in its structure and surface. This work was synthesized using co-precipitation method from aqueous solutions tungstates and molybdates of zinc doped with rare earth ions (Scheme **1a** [  $Zn_{0.95}Eu_{0.05}WO_4$  ], **1b** [  $Zn_{0.95}Eu_{0.05}(WO_4)_{0.5}(MoO_4)_{0.5}$  ], **1c** [  $Zn_{0.95}Eu_{0.025}Tb_{0.025}WO_4$  ]) and coated with a thin layer of silica (scheme **1d**) using the hydrolysis and condensation of tetraethoxysilane (TEOS). For the phenantroline ligand functionalization, 3-(chloropropyl)triethoxy-silane (CPES) was grafted onto the particle surfaces in their aqueous suspensions, and bound to modified phenanthroline. For the synthesis of doped tungstates and molybdates, equivalent amounts of zinc, terbium, and europium chlorides were added under stirring at 70 °C for 1h. After drying, the material was ground with TEOS, water, ethanol and remained (with catalyze acid) for 3h at 70 °C under constant agitation. The 1,10-Phenanthroline (scheme **1e**) has been nitrated ( $H_2SO_4/HNO_3$ ) (scheme **1f**) and reduced (Sn/HCl) (scheme **1g** and infrared) to then be coupled to the modified particle. The final product was characterized. We are currently improving and studying synthesis conditions and applications.



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