

PREPARATION OF LUMINESCENT $\text{RE}_{2-x}\text{Eu}_x(\text{MoO}_4)_3$ (RE=Y AND La) AMINO-FUNCTIONALIZED SILICA NANOPARTICLES FOR BIOLOGICAL APPLICATIONS

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Nanomaterials are used in many areas of biological research. Nanoparticles can be used as active components in various functional materials and devices of interest for bio-applications. Nanoparticles have long been signaled as a potential revolution in the way we probe and interact with biological materials and organisms. This is because they are small enough to interact with their environment at a molecular level, but strong enough to maintain useful properties such as luminescence over extended periods. However, the physical properties of the host materials with nanometer dimensions may differ markedly from those of their bulk counterparts due to the particle size-dependent influences such as structure disordering and surface defects.

The development of materials incorporated in the silica has been studied since these materials exhibit intrinsic luminescent properties of the inorganic part and characteristics of the silica matrix. In the present work $\text{RE}_{2-x}\text{Eu}_x(\text{MoO}_4)_3$ compounds incorporated into silica particles were prepared using a microwave synthesis procedure. Then, the material was dispersed in ethyl alcohol and functionalized with APTES: 3-aminopropyltriethoxysilane. The emission spectra show broad bands when compared with the emission spectra of the own rare earth compound. The narrow lines are assigned to $^5\text{D}_0 \rightarrow ^7\text{F}_{0-4}$ transitions.

Emission spectrum of the $\text{RE}_{2-x}\text{Eu}_x(\text{MoO}_4)_3 @ \text{Si}$ dispersion showed an enlargement of the bands. It is also observed the broadened peak of the $^5\text{D}_0 \rightarrow ^7\text{F}_1$ transitions in the luminescent amino-functionalized silica particles as compared with the core compound spectrum. These materials were conjugated to anti-PSA antibody and presented high efficient performance in detect PSA from the blood serum. They can concluded that particles are potential candidates for development of the bioassays acting as a biomarker.

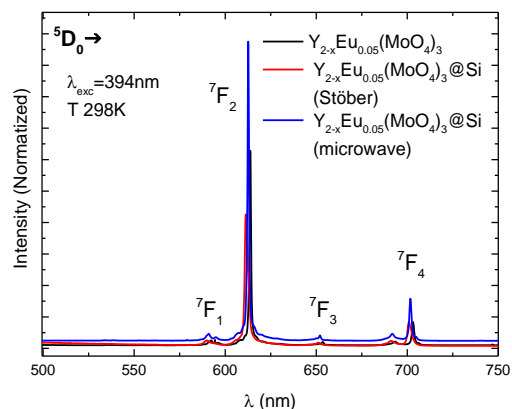
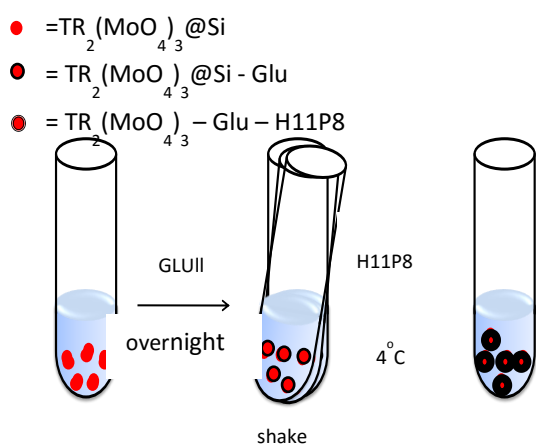


FIG Protocol of nanoparticle functionalization (A) and Emission spectra of $\text{RE}_{2-x}\text{Eu}_x(\text{MoO}_4)_3$ functionalized by Microwave and Stöber Methods