Preparation of luminescent $Y_{2-x}Eu_x(MoO_4)_3$ amino-functionalized silica nanoparticles for biological applications

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The use of labelling or staining agents has greatly assisted the study of complex biological interactions in the field of biology. In particular, luminescent labelling of biomolecules has been demonstrated as an indispensable tool in many biological studies. Besides nanoparticles have long been foreshowed as a potential revolution in the way we probe and interact with biological materials and organisms[1,2]. Nanomaterials are used in many areas of biological research. 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 $\mathbf{Y_{2-x}Eu_x(MoO_4)_3}$ 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-aminopropyltriethoxisilane. The emission spectra show broad bands when compared with the emission spectra of the own rare earth compound. The narrow lines are assigned to $^5D®^7F_{0-4}$ transitions.

Emission spectrum of the $Y_{2-x}\mathbf{Eu_x(MoO_4)_3}$ **@ Si** dispersion showed an enlargement of the bands . It is also observed the broadened peak of the $^5D®^7F_J$ transitions in the luminescent amino-functionalized silica particles as compared with the 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.