Preparation of luminescent $Nd_2(MoO_4)_3$ amino-functionalized silica nanoparticles for bioconjugation

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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 **$Nd_2(MoO_4)_3$** 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 4f–4f transitions from the emitting $^4F_{3/2}$ level to the $^4I_{9/2}$ and, $^4I_{11/2}$ levels, centered around 915 and 1060 respectively..

Emission spectrum of the **$Nd_2(MoO_4)_3$ @ Si** dispersion showed an enlargement of the bands. It is also observed the broadened peak of the $^4F_{3/2} \rightarrow {}^4I_{9/2}$, $^4I_{11/2}$ transitions in the luminescent amino-functionalized silica particles as compared with the core compound spectrum. These materials were conjugated to anti-IgG antibody and presented high efficient performance in detect human antigen. They can concluded that particles are potential candidates for development of the bioassays acting as a biomarker.

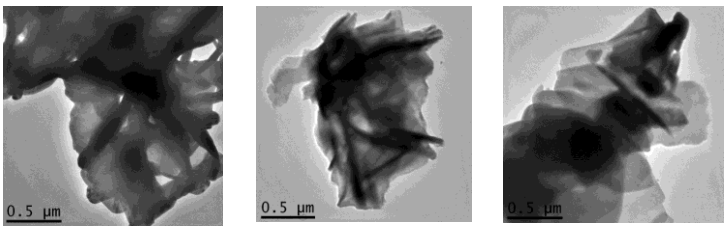

FIG TEM image of $Nd_2(MoO_4)_3$ functionalized by Microwave and Stöber Methods

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