

# Luminescent material based on $\text{Eu}(\text{TTA})_3(\text{H}_2\text{O})_2$ complex incorporated into modified silica particles for biological applications

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The development of functionalized silica particles containing luminescent materials has received special attention because of their biological applications such as optical markers *in vitro* and *in vivo*, clinical diagnosis and drug delivery [1]. The incorporation of  $\text{Eu}^{3+}$ -complexes into modified silica particles combine optical characteristics of  $\text{Eu}^{3+}$ -complexes and properties of inorganic oxides, resulting in organic–inorganic hybrid materials. The purpose of this study was to prepare silica particles encapsulated with luminescent complex and verify the application of these materials as marker in a biological assay. In the present work,  $\text{Eu}(\text{TTA})_3(\text{H}_2\text{O})_2$  complex incorporated into silica particles were prepared using a Stöber synthesis procedure and aminofunctionalized. Determination of the amino groups in the particles was performed using the method involving ninhydrin. The molecular interactions between the luminescent aminofunctionalized marker and biomolecules were verified. In this case, a horseradish peroxidase (HRP) enzyme was used to provide information on the bioconjugation process [2]. The results of these interactions were quantified by colorimetric assay using the enzyme-substrate reaction. The absorbance was recorded by an ELISA plate reader. The color development was proportional to the concentration of the enzyme. The functionalized particles were able to perform the covalent conjugation of antibodies in an assay using oxidized low density lipoprotein (oxLDL), responsible for development of cardiovascular diseases.

**Keywords:** Europium, complex, silica, functionalization, luminescence, oxidized low density lipoprotein (oxLDL).

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