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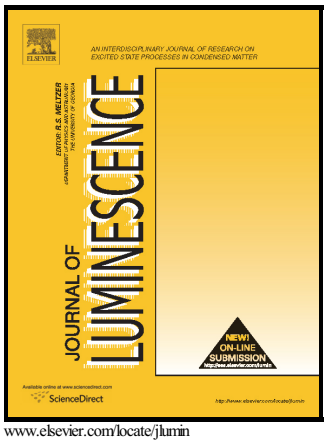

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On the Rare Earth Functionalization of nano-Clays with Luminescent Reporters for Biophotonics

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Abstract

Completely water dispersible nanoclays can be equipped with optical functions for eventual uses in biophotonics. For this purpose, 3-Mercaptopropylmethyldimethoxysilane is grafted as a linker to the rims of strongly anisotropic clay disks for the subsequent covalent attachement of a rare earth β-diketonate, co-coordinated with epoxy-functional phenanthroline ("Eu(ttfa)$_3$epoxiphen"). Silane grafting yields of approximately 80 % with respect to available rim-SiOH groups can be obtained as demonstrated by reliable determination of the grafted mercapto-groups with 5,5'-dithiol-*bis*-(2nitrobenzoic acid) ("Ellman's reagent"). The final linkage of Eu(ttfa)$_3$epoxiphen to the rim mercapto-groups competes with mere polar adsorption on the laponite faces, however, the rim linkage can be confirmed via the complex' excitation and emission spectra and X-ray diffraction of the solids obtained and corresponding absorption spectra.

Introduction

Nanoscaled clays are both, important additives in technical chemistry for their unique rheological behavior, and interesting host materials for the imbedding of a realm of guest molecules [1] for e.g. catalysis or optical functions, the latter being of highest interest owing to their complete dispersibility in aqueous media. The exploitation of their capability to adsorb