

Accepted Manuscript

Research paper

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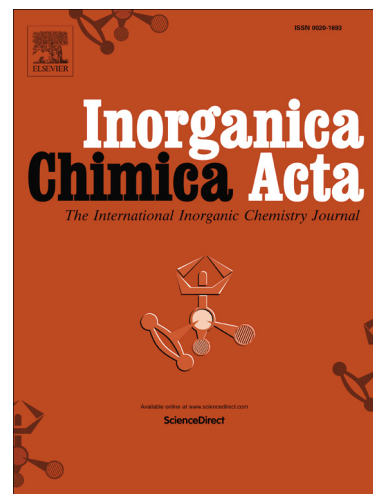
PII: S0020-1693(16)30654-5
DOI: <http://dx.doi.org/10.1016/j.ica.2016.10.010>
Reference: ICA 17303

To appear in: *Inorganica Chimica Acta*

Received Date: 20 July 2016
Revised Date: 1 October 2016
Accepted Date: 5 October 2016

Please cite this article as: M. Burak Coban, A. Amjad, M. Aygun, H. Kara, Sensitization of Ho^{III} and Sm^{III} luminescence by efficient energy transfer from antenna ligands: Magnetic, Visible and NIR Photoluminescence Properties of Gd^{III}, Ho^{III} and Sm^{III} Coordination Polymers, *Inorganica Chimica Acta* (2016), doi: <http://dx.doi.org/10.1016/j.ica.2016.10.010>

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Sensitization of Ho^{III} and Sm^{III} luminescence by efficient energy transfer from antenna ligands: Magnetic, Visible and NIR Photoluminescence Properties of Gd^{III}, Ho^{III} and Sm^{III} Coordination Polymers

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Abstract

Hydrothermal reactions of lanthanide metal salts with 2-sulfoterephthalate (2-stp) and 4,4'-bipyridine (4,4'-bipy) led to three coordination polymers, {[Ln(2-stp)(4,4'-bipy)(H₂O)]·(H₂O)}, [Ln = Gd (**1**), Ho (**2**) and Sm (**3**)]. Their structures have been established by X-ray single crystal diffraction. Complexes **1–3** are isostructural with 2D framework in which all Ln^{III} atoms are nine-coordinated. All these 2D layers are further interlinked via hydrogen bonds resulting in 3D architecture. The solid-state photoluminescence measurements display the characteristic luminescence of Ho (**2**) and Sm (**3**), which is due to efficient energy transfer from the ligands to the central Ln^{III} ions via an “antenna effect”. Variable-temperature magnetic susceptibility and isothermal magnetization as function of external magnetic field for **1–3** is studied which reveal mainly the presence of antiferromagnetic interactions and the thermal depopulation of Stark sublevels together with crystal field affects.

Keywords: Lanthanide complex; Hydrothermal Synthesis; X-ray structure; Photoluminescence; Magnetic properties

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