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Highly Luminescent Film as Enhancer of Photovoltaic Devices

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ABSTRACT

The most extended Si based conventional photovoltaic cells show low efficiency in the UV region, however this low efficiency can be enhanced by the use of suitable down-shifters or down-converters which transform the wavelength of the incoming radiation into a wavelength for which the Si based cells have high efficiency. In this sense europium(III) luminescent benzoate and phenanthroline (and derivatives) complexes are good candidates for such purposes since they exhibit large absorption at wavelengths below 400 nm and significant emissions at the VIS range. In this work we report the synthesis the crystal structure and the spectroscopic properties of two new Eu^{3+} and Gd^{3+} complexes with the ligands 4,7-biphenyl-1,10-phenanthroline (bphen) and benzoate (bz), namely, $[\text{Eu}_2(\text{bphen})_2(\text{bz})_6]$ (**1**) and $[\text{Gd}_2(\text{bphen})_2(\text{bz})_6]$ (**2**). The X-ray single crystal study reveals a dinuclear molecular structure for the Eu^{3+} complex with two bridging benzoate ligands between the two equivalent Eu^{3+} ions. The Powder X-ray diffraction study shows that the Eu^{3+} and Gd^{3+} compounds are isostructural and allows the use of the Gd^{3+} compound for the characterization of the excited states of the complexes which were investigated to explain the sensitization process that lead to

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