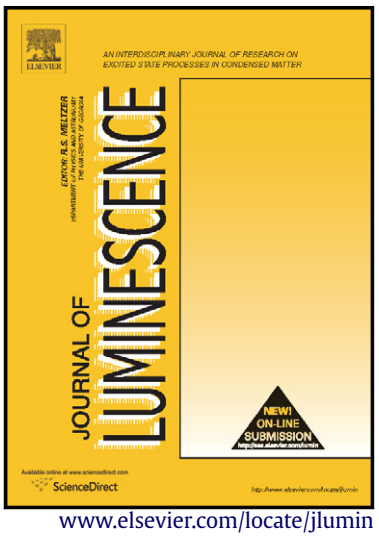

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Sprayed films of europium complexes toward light conversion devices

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Abstract

Rare-earth complexes have become subject of intensive research due to the high quantum efficiency of their emission, very narrow bands, and excellent fluorescence monochromaticity. The chemical design and characterization of Eu complexes based on β-diketone ligands hexafluoroacetylacetate (hfac) and dibenzoylmetanate (dbm) is reported here. $K[Eu(dbm)_4]$ and $K[Eu(hfac)_4]$ complexes were immobilized as thin films by using the spray technique, a promising methodology for practical applications. The latter provides not only a faster layer deposition but also larger coated areas compared to conventional methods, such as Layer-by-Layer (LbL) and Langmuir-Blodgett (LB). The growth of the sprayed films was monitored through microbalance (QCM) and ultraviolet–visible (UV-Vis) absorption spectroscopy, which reveal a higher mass and absorbance per deposited layer of $K[Eu(dbm)_4]$ film. Micro-Raman images display a more homogeneous spatial distribution of the $K[Eu(dbm)_4]$ complex throughout the film, when compared to $K[Eu(hfac)_4]$ film. At nanometer scale, atomic force microscopy (AFM) images indicate that the roughness of the $K[Eu(hfac)_4]$ film is approximately one order of magnitude higher than that for the $K[Eu(dbm)_4]$ film, which pattern is kept at micrometer scale according to micro-Raman measurements. The

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