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New dinuclear lanthanide coordination compounds with imidazole derivatives: magnetic properties and luminescent profiles

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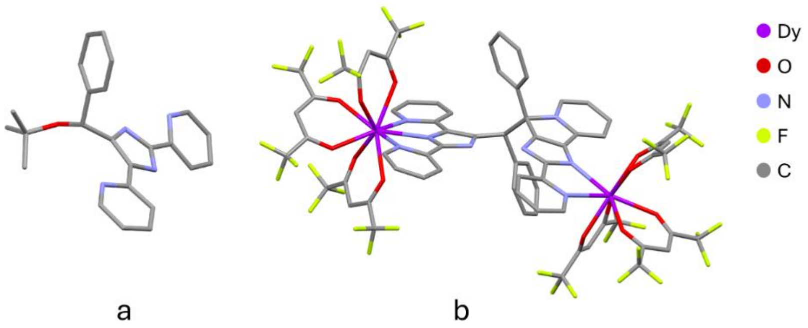
In the search of new magnetic and luminescent materials, our research group explored the coordination capabilities of a family of imidazole trisubstituted derivatives, which behave as asymmetric polytopic ligands towards lanthanide ions.

In this work we present the synthesis, structural and magnetic characterization, and emission profiles of dinuclear coordination compounds obtained from the reaction of lanthanide precursors and the (tert-butoxy-(phenyl)methyl)-dipyridine-imidazole.

The novel asymmetric ligand L = bis(benzyl-dipyridine-imidazole) was formed *in situ* by the reaction of two monomeric units of (tert-butoxy-(phenyl)methyl)-dipyridine-imidazole in the presence of $Ln(hfac)_3(H_2O)_3$ (with hfac = hexafluoroacetylacetonate, Ln = Tb, Dy). As a result, the dinuclear complexes of general formula $[Ln(hfac)_3(\mu\text{-}L)(hfac)_3Ln]$ were obtained. X-ray diffraction studies revealed that each molecule has two non-equivalent metal ions, being eight- and nine-coordinated, due to the different coordination modes adopted by the ligand L. The intermolecular interactions consist of F···F and F···H bonds. The magnetic properties of the Dy complex were studied, showing that there is no magnetic exchange between the metal ions. This compound shows a strong emission of visible light when irradiated with UV light.



Perspective drawing of the ligand (tert-butoxy-(phenyl)methyl)-dipyridine-imidazole (a) and complex $[Dy(hfac)_3(\mu\text{-}L)(hfac)_3Dy]$ (b)

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