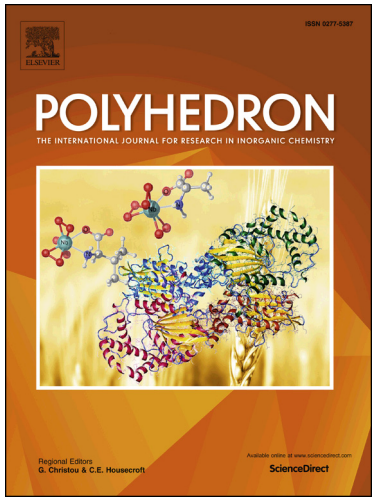

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Structures, fluorescence properties and magnetic properties of a series of dinuclear lanthanide(III) compounds: Dy_2 compound showing single-molecule magnet behavior

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Abstract

A series of dinuclear lanthanide(III) compounds, namely, $[Ln_2(tmhd)_2L_2(CH_3OH)_2]$ (Ln(III) = Sm (**1**), Eu (**2**), Dy (**3**) and Er (**4**); H_2L = 2-amino-benzoic acid (8-hydroxy-quinolin-2-ylmethylene)-hydrazide, Htmhd = 2,2,6,6-tetramethyl-3,5-heptanedione), have been synthesized, structurally and magnetically characterized. The X-ray structural analysis exhibit that **1**-**4** are phenoxo-O-bridged dinuclear compounds and central Ln(III) ions are eight-coordinated with one bidentate $tmhd^-$, one CH_3OH and two μ_2-O bridging Schiff base ligands. Magnetic measurements indicated that slow magnetic relaxation behaviors were observed in **3**, with energy barrier ($\Delta E/k_B$) of 13.14 K and $\tau_0 = 4.58 \times 10^{-6}$ s, however, no out-of-phase (χ'') alternating current (ac) signals noticed in **1**, **2** and **4**. Additionally, solid-state luminescence properties reveal that **1**-**3** display the characteristic Ln^{III} luminescence at room temperature.

***Keywords*:** dinuclear lanthanide(III) compounds; fluorescence properties; magnetic properties; single-molecule magnet behavior.

1. Introduction

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