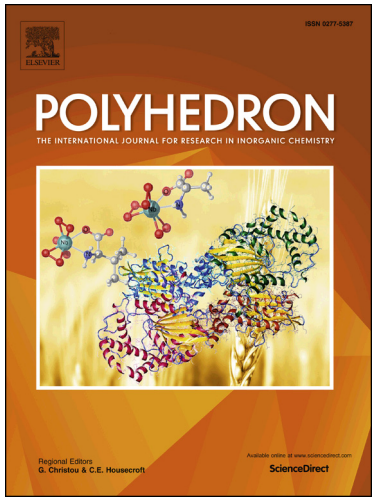

One new planar Dy_4 compound: synthesis, structure and its magnetic dynamics behaviors

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One new planar Dy_4 compound: synthesis, structure and its magnetic dynamics behaviors

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Abstract: The self-assembly of tetranuclear dysprosium based on triangular Dy_3 system by using 5-(4-methoxybenzylidene)-8-hydroxylquinoline (HL) and 1,3-diphenyl-1,3-propanedione (dppd) afford a new compound $[Dy_4(\mu_3\text{-}OH)_2L_6(dppd)_4]\cdot 2CH_3CN$ (**1**). It was structurally and magnetically characterized. The results indicate that the four Dy ions is of typical rhombus topology and weak ferromagnetic interactions exists between adjacent Dy^{3+} ions. Additionally, it also displays slow magnetic relaxation behavior with energy barrier U_{eff} of 62.36 K.

Keyword: Tetranuclear dysprosium, Ferromagnetic interactions, Slow magnetic relaxation

1. Introduction

In recent years, single molecule magnets (SMMs) as nanomagnetic materials have received considerable attention in the fields of chemistry, physics and material science due to their potential applications and quantum phenomenons [1-3]. Various metal-based SMMs have been explored to pursue for their unique magnetic behaviors. Particularly, a great progress of abundant lanthanide-based SMMs have been witnessed during the past several years [4-7], including many examples exhibiting high blocking temperatures and anisotropic barriers, which all benefited from their large intrinsic magnetic anisotropy in lanthanide ions. Impressively, a highly stable Dy-based molecule prepared by Tong's group exhibits high energy barrier up to 1025 K, which mainly arise from its resonant spin-lattice relaxation via the third excited Kramers doublet and a nearly D_{5h} symmetry ligand field [8]. Soon afterwards, Zheng

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