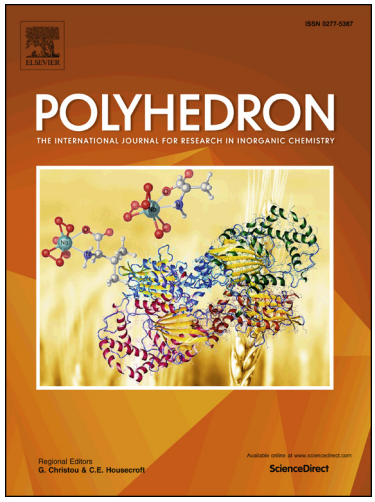

A series of rhombus-shaped Ln_4 clusters: syntheses, structures, luminescence properties and the SMM behavior of the Dy_4 analogue

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PII: S0277-5387(18)30218-3
DOI: https://doi.org/10.1016/j.poly.2018.04.041
Reference: POLY 13143

To appear in: *Polyhedron*

Received Date: 19 March 2018
Accepted Date: 27 April 2018

Please cite this article as: Q-L. Wang, R-F. Wu, C-Z. Cai, R-X. Yue, Y. Gao, P-F. Shi, W-M. Wang, A series of rhombus-shaped Ln_4 clusters: syntheses, structures, luminescence properties and the SMM behavior of the Dy_4 analogue, *Polyhedron* (2018), doi: https://doi.org/10.1016/j.poly.2018.04.041

A series of rhombus-shaped Ln_4 clusters: syntheses, structures, luminescence properties and the SMM behavior of the Dy_4 analogue

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Abstract

A series of tetranuclear lanthanide(III) clusters, namely, $[Ln_4(\mu_3\text{-}OH)_2L_6(acac)_4]\cdot xCH_3CN$ (Ln(III) = Tb(**1**), Dy(**2**) and Ho(**3**), HL = 5-(4-o-hydroxybenzylidene)-8-hydroxylquinoline; acac = acetylacetone), have been synthesized and completely characterized. The X-ray structural analysis exhibit that clusters **1-3** contain one Ln_4 center with rhombus-shaped arrangement, and each Ln(III) ion of them is located in a distorted square-antiprismatic coordination sphere. Magnetic measurements indicated that single molecule magnets behaviors were observed in **2**, with energy barrier ($\Delta E/k_B$) of 55.17 K and τ_0 = 8.19 × 10^{-7} s. Additionally, luminescence properties study reveal that **1** and **2** display the characteristic Tb^{III} and Dy^{III} luminescence at room temperature.

***Keywords*:** tetranuclear lanthanide(III) clusters; structures; magnetic properties; luminescence properties; single molecule magnets behaviors

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