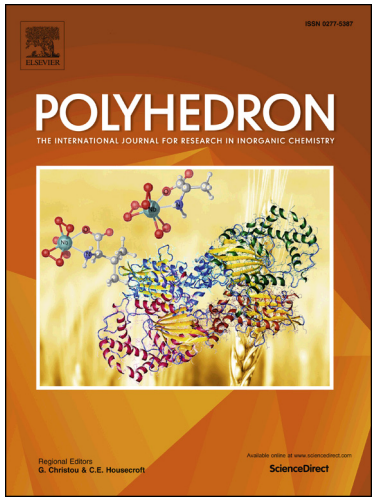

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PII: S0277-5387(17)30061-X
DOI: http://dx.doi.org/10.1016/j.poly.2017.01.024
Reference: POLY 12428

To appear in: *Polyhedron*

Received Date: 24 December 2016
Revised Date: 16 January 2017
Accepted Date: 17 January 2017

Please cite this article as: Z-L. Wu, Y-G. Ran, X-Y. Wu, Y-P. Xia, M. Fang, W-M. Wang, Butterfly shaped tetranuclear dysprosium compound displaying slow magnetic relaxation features, *Polyhedron* (2017), doi: http://dx.doi.org/10.1016/j.poly.2017.01.024

Butterfly shaped tetranuclear dysprosium compound displaying slow magnetic relaxation features

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Abstract:

One new tetranuclear dysprosium compound, namely $[Dy_4(\mu_3\text{-}OH)_2(L)_6(tmhd)_4]\cdot CH_3CN$ (**1**) (HL = 5-(4-methylbenzylidene)-8-hydroxylquinoline; tmhd = 2,2,6,6-tetramethyl-3,5-heptanedione) was successfully synthesized and characterized. The structure of **1** was established by the single crystal X-ray diffraction technique, and the center Dy(III) ions was bridged by μ_3-OH molecules and phenoxide oxygen atoms, displaying a 'butterfly' arrangement. Magnetic studies reveal that weak ferromagnetic interaction between adjacent Dy(III) exists in **1**. Additionally, it also exhibits slow magnetic relaxation behaviors with the energy barrier of 46.4 K.

1. Introduction

Since the discovery of the famous $[Mn_{12}O_{12}(OAc)_{16}(H_2O)_4]$ that exhibits slow magnetic relaxation, single-molecule magnets (SMMs) have received much attention due to their prospects of application in information storage and quantum computing [1]. For the past several years, for further development of this field, much efforts have been focused on the pursue of an high anisotropic energy barrier [2]. Lanthanide compounds are good candidates for achieving this purpose compared to the transition-metal based SMMs because of their large magnetic anisotropy. Thus, many Dy-based compounds with dazzling of topologies based on dimeric [3], triangular [4], square-shape [5], or square-based pyramid [2c, 6], or defect-dicubane [2b, 7], have

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