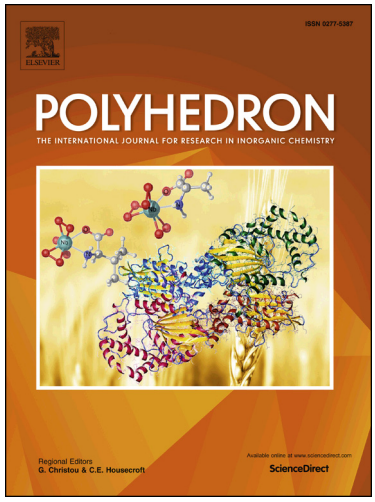

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PII: S0277-5387(18)30249-3
DOI: https://doi.org/10.1016/j.poly.2018.05.011
Reference: POLY 13158

To appear in: *Polyhedron*

Received Date: 22 March 2018
Accepted Date: 6 May 2018

Please cite this article as: Y-Y. Nie, W-M. Wang, X-Y. Chu, H-M. Chen, S-X. Huang, Z. Liu, J-Z. Cui, H-L. Gao, Near-infrared luminescence and solvent modulation of the magnetic relaxation behavior of dinuclear lanthanide complexes, *Polyhedron* (2018), doi: https://doi.org/10.1016/j.poly.2018.05.011

Near-infrared luminescence and solvent modulation of the magnetic relaxation behavior of dinuclear lanthanide complexes

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Abstract

Seven new dinuclear centrosymmetric complexes, $[Ln_2(dbm)_2L_2(DMF)_2]\cdot 2DMF$ (Ln = Nd (**1**), Eu (**2**), Tb (**3**), Dy (**4**), Er (**5**), Yb (**6**)) and $[Dy_2(dbm)_2L_2(CH_3OH)_2]\cdot 2CH_3OH$ (**7**) (Hdbm = 1,3-diphenyl-1,3-propanedione, H_2L = 2-[(2-(amino)benzhydrazide)-methyl]-8-hydroxylquinoline, DMF = dimethyl-formamide) have been synthesized and structurally characterized. Dynamic magnetic studies reveal the slow magnetic relaxation of complexes **4** and **7** are influenced by a fast quantum tunneling relaxation of the magnetization (QTM). However, the different magnetic relaxation behaviors were observed apparently in the two Dy_2 complexes under a 3000 Oe *dc* field and modulated by the subtle change of solvents from DMF to CH_3OH. For complex **7**, the temperature dependence curves of in-phase (χ') and out-of-phase (χ'') show better frequency-dependent signals, suggesting a slow relaxation of magnetization, typical of SMM behavior. Fitting the dynamic magnetic data of complex **7** to the Arrhenius law gives the energy barrier U_{eff}/k_B = 44.06 K with the pre-exponential factor τ_0 =2.17 × 10^{-7} s under a 3000 Oe *dc* field.

***Keywords*:** 8-hydroxyquinoline Schiff base derivative; dinuclear lanthanide complexes; single-molecule magnets; magnetic relaxation behavior.

1. Introduction

A great deal of single-molecule magnets (SMMs) exhibiting slow magnetic relaxation behaviors have been reported because of their huge potential applications

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