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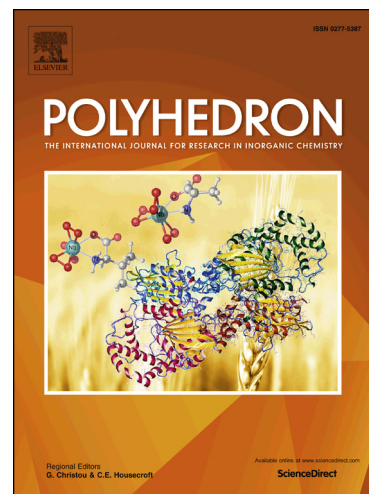
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Two new coplanar tetranuclear lanthanide complexes (Ln = Gd(III) and Dy(III)) with magnetic refrigeration and slow magnetic relaxation behaviors

Meng Li,^a Ning Gao,^a Qiu Jin,^a De-Rui Deng,^a Bi-Ying Liu,^a Gong-Ping Tang,^a Hai-Ying Wei,^{a,b} Yue-Hua Zhang,^a Zhi-Lei Wu^{*a,b,c}

^a College of Chemistry and Environmental Science, Hebei University, Baoding, 071002, P. R. China.

^b Key Laboratory of Medicinal Chemistry and Molecular Diagnosis (Ministry of Education), Hebei University, Baoding, 071002, P. R. China.

^c Key Laboratory of Advanced Energy Materials Chemistry (Ministry of Education), Nankai University, Tianjin 300071, PR China.

ABSTRACT:

Two novel tetranuclear Ln (III) complexes, namely [Ln₄(μ₃-OH)₂(tmhd)₄L₆] (Ln(III) = Gd (1), Dy (2); HL = 5-(2-thenylidene)-8-hydroxylquinoline; tmhd = 5-(4-methylbenzylidene)-8-hydroxylquinoline), were synthesized and their structures and magnetic properties were characterized. The two complexes are both composed of one planar [Ln₄(μ₃-OH)₂] center, in which adjacent eight-coordinated Ln(III) ions are bridged by phenoxy oxygen atoms and μ₃-OH molecules. A magnetic investigation revealed that complex **1** displays cryogenic magnetic refrigeration properties with $-\Delta S_m = 21.13 \text{ J kg}^{-1} \text{ K}^{-1}$ at $T = 2.5 \text{ K}$ and $\Delta H = 7.0 \text{ T}$. For complex **2**, a slow magnetic relaxation behavior with an energy barrier of 67.8 K was observed.

Keywords: Coplanar; Tetranuclear; Lanthanide complexes; Magnetic refrigeration; Slow magnetic relaxation

1. Introduction

In the past few years, magnetic materials, especially single molecule magnets (SMMs), have attracted much attention from physical and chemical scientists for their diverse potential applications in many fields, such as quantum computation, information storage and information processing [1-3]. Since the first Ln-based SMMs

*Corresponding author. E-mail: weihy@hbu.edu.cn.

*Corresponding author. E-mail: wuzhilei03@163.com.

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