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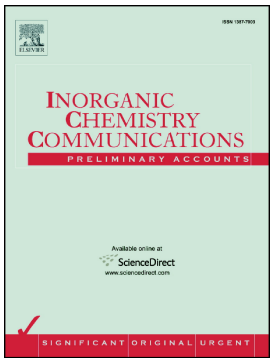

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Three cyclic lanthanide-radical complexes syntheses, crystal structures and magnetic properties

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ABSTRACT

Three lanthanide–nitronyl nitroxide radical complexes $[Ln(hfac)_3(NIT\text{-}2Br\text{-}4Py)]_2$ (Ln(III) = Gd (**1**), Tb (**2**), Dy (**3**); hfac = hexafluoroacetylacetonate; NIT-2Br-4Py = 2-(2′-bromo-4′-pyridyl)-(4,4,5,5-tetramethyl-3-oxylimidazoline-1-oxide)) have been synthesized. Single crystal X-ray diffraction analysis reveals that complexes **1**-**3** are isomorphous in which NIT-2Br-4Py acts as a bridging ligand linking two Ln(III) ions through the nitrogen atom of pyridine ring and the oxygen atom of N-O group to form a four-spin system. The magnetic studies show that ferromagnetic coupling interaction between Ln(III) ions and nitronyl nitroxide radical. Moreover, ac measurements show that Tb(III) complex exhibits frequency-dependent signals at low temperature.

Keywords: Lanthanides, Nitronyl nitroxide, Single-molecule magnet, Slow magnetic relaxation

In the past two decades, research on single-molecule magnets (SMMs) which could exhibit slow magnetic relaxation at molecule level have attracted much attention. The interest in such kind of compounds is due to their possible applications in high density magnetic storage, quantum computation as well as magnetic refrigeration [1–6]. Lanthanide ions are good candidates for construction of SMMs due to their significant magnetic anisotropy arising from the large, unquenched orbital angular momentum [7–16]. Unfortunately, the intrinsic drawbacks of lanthanide ions such as the dipolar spin–spin interactions and quantum tunneling always reduce the

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