Uniwersytet Wrocławski

Repozytorium

Plik pochodzi z repozytorium Wydziału Chemii Uniwersytetu Wrocławskiego

Trinuclear and hexanuclear lanthanide(III) complexes of the chiral 3+3 macrocycle: X-ray crystal structures and magnetic properties.

Autorzy

Tomasz Bereta

Abhishake Mondal

Katarzyna Ślepokura

Yan Peng

Annie K. Powell

Jerzy Lisowski

Rok wydania

2019

Czasopismo

Inorganic Chemistry

Numer woluminu

58

Strony

4201-4213

DOI

10.1021/acs.inorgchem.8b03266

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

A new triphenolic hexaaza chiral macrocyclic amine L forms trinuclear complexes **1–3** with rare earth metal lanthanide(III) ions (Ln = Dy, Eu, and Y) with the general formula $[Ln_3L(\mu_3\text{-}OH)_2(NO_3)_4(H_2O)_2]\cdot x CH_3OH$. The crystal structures of the nitrate derivatives of this type reveal the presence of a $\{Ln_3(\mu_3\text{-}OH)_2\}$ core within the macrocycle. For the chloride derivative of dysprosium(III) **4**, a duplex of the trinuclear compound is formed to give the hexanuclear $[Dy_6L_2(\mu_3\text{-}OH)_3(\mu_3\text{-}O)(\mu_2\text{-}Cl)_3Cl_4(H_2O)_2]$ compound, in which two trinuclear macrocyclic units are linked by bridging chloride anions, supplemented by a hydrogen bond connecting the central oxo and hydroxo bridges as well as by weak interactions at the periphery of the macrocycle. The nuclear magnetic resonance spectra of these complexes reveal a dynamic behavior in solution related to exchange of axial ligands and hindered rotation of phenyl substituents. Magnetic studies of the nitrate (**1–3**) and chloride (**4**) dysprosium(III) complexes suggest the presence of weak ferromagnetic interactions between neighboring metal centers. The interaction is strongest for compound **1**, and for the related duplex compound **4**, it appears to be somewhat weaker. The ac susceptibility measurements for complexes **1** and **4** confirm their field-induced single-molecule magnet behavior with the following characteristics: U_{eff} = 10.6 cm^{-1} (15.2 K), $\tau_0 = 2.05 \times 10^{-4}$ s under 2500 Oe dc fields for **1**; U_{eff} = 7.9 cm^{-1} (11.4 K), $\tau_0 = 1.68 \times 10^{-4}$ s under a 3000 Oe dc field for **4**.

Adres publiczny

https://doi.org/10.1021/acs.inorgchem.8b03266

Strona internetowa wydawcy

https://www.acs.org/content/acs/en.html

Plik został wygenerowany dnia 2026-10-30 14:46:36

Adres w repozytorium https://old.chem.uni.wroc.pl/pl/repozytorium/s65IEdG.