

Heptanuclear heterometallic [Cu₆Ln] clusters: trapping lanthanides into copper cages with artificial amino acids.

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Rok wydania

2012

Czasopismo

Inorganic Chemistry

Numer woluminu

51

Strony

5911-5918

DOI

10.1021/ic300538q

Kolekcja

Naukowa

Język

Angielski

Streszczenie

Employment of the artificial amino acid 2-amino-isobutyric acid, aibH, in Cu(II) and Cu(II)/Ln(III) chemistry led to the isolation and characterization of 12 new heterometallic heptanuclear [Cu₆Ln(aib)₆(OH)₃(OAc)₃(NO₃)₃] complexes consisting of trivalent lanthanide centers within a hexanuclear copper trigonal prism (aibH = 2-amino-butyric acid; Ln = Ce (1), Pr (2), Nd (3), Sm (4), Eu (5), Gd (6), Tb (7), Dy (8), Ho (9), Er (10), Tm (11), and Yb (12)). Direct current magnetic susceptibility studies have been carried out in the 5-300 K range for all complexes, revealing the different nature of the magnetic interactions between the 3d-4f metallic pairs: dominant antiferromagnetic interactions for the majority of the pairs and dominant ferromagnetic interactions for when the lanthanide center is Gd(III) and Dy(III). Furthermore, alternating current magnetic susceptibility studies reveal the possibility of single-molecule magnetism behavior for complexes 7 and 8. Finally, complexes 2, 5-8, 10, and 12 were analyzed using positive ion electrospray mass spectrometry (ES-MS), establishing the structural integrity of the heterometallic heptanuclear cage structure in acetonitrile.

Adres publiczny

<http://dx.doi.org/10.1021/ic300538q>

Strona internetowa wydawcy

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

Typ publikacji

Artykuł

Plik został wygenerowany dnia 2026-05-13 15:01:25

Adres w repozytorium <https://old.chem.uni.wroc.pl/pl/repozytorium/Eb1BVuu>.