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Carbonato-bridged heteronuclear $Ni_2^{II}Ln_2^{III}$ (Ln=Tb, Dy, Ho, Er, Tm, Yb, Lu) complexes synthesized by fixation of atmospheric CO_2 : structural and magnetic studies.

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Rok wydania

2015

Czasopismo

Polyhedron

Numer woluminu

85

Strony

697-704

DOI

10.1016/j.poly.2014.09.036

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

A series of carbonato-bridged heteronuclear Ni^{II}_2 Ln^{III}_2 complexes $2[(\mu_4\text{-}CO_3)_2\{NiLn(L)(MeOH)(CH_3COO)\}_2]\cdot 9H_2O\cdot 8MeOH$ (Ln=Tb (1), Dy (2), Ho (3), Er, (4)), $[(\mu_4\text{-}CO_3)_2\{NiLn(L)(MeOH)(CH_3COO)\}_2]\cdot 2H_2O\cdot 4MeOH$ (Ln=Tm (5)) and $[(\mu_4\text{-}CO_3)_2\{NiLn(L)(MeOH)(CH_3COO)\}_2]\cdot 4MeOH$ (Ln=Yb (6), Lu(7)) with N,N′-bis(5-bromo-3-methoxysalicylidene)propylene-1,3-diamine (L) are reported. The complexes were obtained by a one-pot reaction with spontaneous fixation of atmospheric CO_2 into the coordination species during crystallization process. In each complex the Ni^{II}_2 Ln^{III}_2 metal core has a similar topology. The hexadentate Schiff base ligands chelate the Ni(II) and Ln(III) ions forming two binuclear units, that are linked by two CO_3^{2-} ions giving a carbonato bridged $(\mu_4\text{-}CO_3)_2\{Ni^{II}Ln^{III}\}_2$ structures. Ferromagnetic interactions between 3d–4f metal centers have been observed for compounds 1 and 2. In complexes 3–6 both the isotropic exchange as well as of thermal depopulation of m_J sublevels and magnetic anisotropy are observed. In compound 7, due to the nonmagnetic nature of the ground state of Lu(III) ions, only a weak antiferromagnetic interaction between Ni(II) ions occurs.

Słowa kluczowe

3d-4fcomplexes, carbonate-bridge, tetranuclear compounds, Magnetic properties, Schiff base complex

Adres publiczny

http://dx.doi.org/10.1016/j.poly.2014.09.036

Strona internetowa wydawcy

http://www.elsevier.com

Plik został wygenerowany dnia 2026-10-31 19:03:28

Adres w repozytorium https://old.chem.uni.wroc.pl/pl/repozytorium/4plfPKp.