

Carbonato-bridged heteronuclear $\text{Ni}_2^{\text{II}}\text{Ln}_2^{\text{III}}$ (Ln=Tb, Dy, Ho, Er, Tm, Yb, Lu) complexes synthesized by fixation of atmospheric CO_2 : structural and magnetic studies.

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Streszczenie

A series of carbonato-bridged heteronuclear $\text{Ni}_2^{\text{II}}\text{Ln}_2^{\text{III}}$ complexes $2[(\mu_4\text{-CO}_3)_2\{\text{NiLn}(\text{L})(\text{MeOH})(\text{CH}_3\text{COO})\}_2]\cdot 9\text{H}_2\text{O}\cdot 8\text{MeOH}$ (Ln=Tb (1), Dy (2), Ho (3), Er, (4)), $[(\mu_4\text{-CO}_3)_2\{\text{NiLn}(\text{L})(\text{MeOH})(\text{CH}_3\text{COO})\}_2]\cdot 2\text{H}_2\text{O}\cdot 4\text{MeOH}$ (Ln=Tm (5)) and $[(\mu_4\text{-CO}_3)_2\{\text{NiLn}(\text{L})(\text{MeOH})(\text{CH}_3\text{COO})\}_2]\cdot 4\text{MeOH}$ (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 $\text{Ni}_2^{\text{II}}\text{Ln}_2^{\text{III}}$ 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 $(\mu_4\text{-CO}_3)_2\{\text{Ni}^{\text{II}}\text{Ln}^{\text{III}}\}_2$ 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-4f complexes, carbonate-bridge, tetranuclear compounds, Magnetic properties, Schiff base complex

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