

Preparation, crystal structures, and magnetic features for a series of dinuclear [Ni(II)Ln(III)] Schiff-base complexes: evidence for slow relaxation of the magnetization for the Dy(III) derivative

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Abstract :

A series of dinuclear [Ni(II)Ln(III)] Schiff-base complexes (using a Schiff-base dicompartmental ligand derived from o-vanillin [H(2)valpn = 1,3-propanediylbis(2-iminomethylene-6-methoxy-phenol)]) with Ln = La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, and a hydroxo-bridged tetranuclear [Ni(II)Yb(III)] are reported. The crystal structures have been solved for 10 dinuclear complexes revealing four arrangements for the dinuclear units, which are modulated by the coordinated solvent molecules and the nitrate-anion interactions. The magnetic behaviors have been investigated, and the nature of the Ni(II)-Ln(III) exchange interaction has been emphasized by comparison with the behavior of the related [Zn(II)Ln(III)] derivatives. This allowed for establishing that the interaction within these compounds is antiferromagnetic with the 4f ions of the beginning of the Ln series and turns ferromagnetic from Gd(III) toward the end of the series. AC susceptibility investigations clearly show the occurrence of slow relaxation processes of the magnetization close to 2 K for the dinuclear [Ni(II)Dy(III)] complex.

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