

Synthesis, crystal structures, and spectroscopic properties of novel gadolinium and erbium triphenylsiloxide coordination entities.

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Streszczenie

In alkali metal and lanthanide coordination chemistry, triphenylsiloxides seem to be unduly underappreciated ligands. This is as surprising as that such substituents play a crucial role, among others, in stabilizing rare oxidation states of lanthanide ions, taking a part of intramolecular and molecular interactions stabilizing metal-oxygen cores and many others. This paper reports the synthesis and characterization of new lithium $[\text{Li}_4(\text{OSiPh}_3)_4(\text{THF})_2]$ (1), and sodium $[\text{Na}_4(\text{OSiPh}_3)_4]$ (2) species, which were later used in obtaining novel gadolinium $[\text{Gd}(\text{OSiPh}_3)_3(\text{THF})_3]\text{THF}$ (3), and erbium $[\text{Er}(\text{OSiPh}_3)_3(\text{THF})_3]\text{THF}$ (4) triphenylsiloxides. Crystal structures were determined for all 1–4 compounds, and in addition, IR, Raman, absorption spectroscopy studies were conducted for 3 and 4 lanthanide compounds. Furthermore, direct current (dc) variable-temperature magnetic susceptibility measurements on polycrystalline samples of 3 and 4 were carried out in the temperature range 1.8–300 K. The 3 shows behavior characteristics for the paramagnetism of the Gd^{3+} ion. In contrast, the magnetic properties of 4 are dominated by the crystal field effect on the Er^{3+} ion, masking the magnetic interaction between magnetic centers of neighboring molecules.

Słowa kluczowe

lanthanide coordination chemistry, triphenylsilanol, triphenylsiloxide, gadolinium triphenylsiloxide, erbium triphenylsiloxide, X-ray crystallography, IR spectroscopy, Raman spectroscopy, absorption spectroscopy, magnetism

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