

Synthesis, structural study and thermal stability of terbium and samarium complexes with 1,10-phenanthroline

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Abstract. Two lanthanides complexes with the formula $[\text{Ln}(\text{phen})_2(\text{NO}_3)_3]$ ($\text{Ln} = \text{Sm}$ (1), Tb (2), $\text{phen} = 1,10\text{-phenanthroline}$) were synthesized by slow diffusion and characterized structurally by single crystal X-ray diffraction and IR spectra. The two complexes crystallize isostructurally in the monoclinic space group $P2_1/n$. Each $\text{Ln}(\text{III})$ atom is surrounded by four N atoms from two bidentate-chelated phen ligands and six O atoms from three chelating (NO_3) nitrate groups. The IR spectra of the two complexes show characteristic bands of coordinated phen, the coordination mode of ligands is confirmed by apparition of new bands around 400 and 500 cm^{-1} assigned to Ln-N and Ln-O bonds. The thermal properties of these complexes have been studied. The TG/TD experiments confirm absence of water molecules in the structure. The complexes show a thermal stability until 290 °C.

Keywords: lanthanides complexes, phenanthroline, crystal structures, thermal stability.