

## COMPLEXES OF LANTHANIDES(III) BASED ON PHOSPHORYLATED SULFAMIDES: SYNTHESIS AND SPECTRAL INVESTIGATIONS

New complexes with general formula  $\text{Na}[\text{LnL}^1_4]$ ,  $\text{Ln} = \text{La, Nd, Eu, Yb, Lu}$ ;  $\text{HL}^1 = p\text{-NO}_2(\text{C}_6\text{H}_4)\text{S}(\text{O})_2\text{N}(\text{H})\text{P}(\text{O})(\text{OCH}_3)_2$ , have been synthesized. The composition of the synthesized compounds corresponds to tetrakis-complex based on the trilonometric titration. IR- spectroscopy data were used to the preliminary analysis of coordination mode of the ligand. The low-frequency shift of NH band ( $2967 \text{ cm}^{-1}$ ) in the spectrum of  $\text{HL}^1$  was observed. This fact can be explained by increasing of acidity of  $\text{HL}^1$  in comparison with previously studied  $\text{HL}^2$ . The low-frequency shift of  $\nu(\text{SO}_2)$  and  $\nu(\text{P}=\text{O})$  bands in the spectra of the studied complexes reveals the bidentate coordination of the ligands to the central ion via the oxygen atoms of the phosphoryl and sulphonyl groups in comparison with position of the corresponding bands in spectrum of  $\text{NaL}^1$ . In the  $^1\text{H}$  NMR spectrum of the free ligand (solution in  $\text{DMSO-d}_6$ ) the signal of NH proton is broadened and as a result of exchange processes its chemical shift cannot be defined. The significant low-field shifts of aromatic protons were observed due to the presence of electron- acceptor  $\text{NO}_2$ - substituent in the spectra of  $\text{HL}^1$ ,  $\text{NaL}^1$  and diamagnetic  $\text{Na}[\text{LuL}^1_4]$  complex. Also, the electronic absorption and diffuse reflection spectra were recorded for  $\text{Nd}^{\text{III}}$  complex. The location of signals and their intensities in the region of supersensitive transitions  $^4\text{I}_{9/2} - ^4\text{G}_{5/2}$ ,  $^2\text{G}_{7/2}$  proves that the nearest coordination environment of the central atom in solution does not change in comparison with crystalline samples and waveform is typical for coordination number 8. A comparative analysis of the spectral characteristics of the synthesized complexes with previously investigated complexes  $\text{Na}[\text{Ln}(\text{L}^2)_4]$ , where  $\text{HL}^2 = p\text{-CH}_3(\text{C}_6\text{H}_4)\text{S}(\text{O})_2\text{N}(\text{H})\text{P}(\text{O})(\text{OCH}_3)_2$ , was performed.

Key words: lanthanides, coordination compounds, electronic spectroscopy.