

Comparative optical studies of lanthanide complexes with three types of phosphoro-azo derivatives of β -diketones.

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Streszczenie

A new class of lanthanide compounds of the formula $\text{Na}[\text{LnL}_4] \cdot \text{H}_2\text{O}$ and $\text{LnC}_3 \cdot 2\text{H}_2\text{O}$ (where $\text{L}=\text{Wo}$ or Az ; $\text{Wo}=\text{CCl}_3\text{C}(\text{O})\text{N}(\text{P}(\text{O})(\text{OCH}_3)_2)$; $\text{Az}=\text{C}_6\text{H}_5\text{C}(\text{O})\text{N}(\text{P}(\text{O})[\text{N}(\text{CH}_2)_2]_2)$; $\text{C}=\text{CCl}_3\text{C}(\text{O})\text{N}(\text{P}(\text{O})(\text{NHC}_6\text{H}_5)_2)$) was obtained from mixed solvent solutions with the three types of phosphoro-azo derivatives of the β -diketones. Spectroscopic properties of these complexes are investigated and related to the structure and single crystal spectra of one of the above mentioned compounds [Amirkhanow et al., J. Appl. Spectr. 62 (1995) 5; Amirkhanow et al., Acta Phys. Polonica 90 (1996) 455]. The strong interaction of the ligands with the lanthanides was confirmed both by IR and electronic spectra. The intensities and splitting pattern of the electronic levels were used for the structure determination. IR and Raman spectra in the FIR and MIR regions have been recorded for solid lanthanide(III) (Eu, Pr, Nd) complexes with phosphoro-azo- β -diketones (Wo, Az and C). The normal coordinate analysis and potential energy distribution were performed for $\text{Ln}(\text{NPC}_2\text{O}_4)$ molecular system consisting four chelate rings. On that basis, the assignment of the bands observed is proposed and related to the crystal structure of the complexes studied.

Słowa kluczowe

Phosphoro-azo, β -Diketones of Ln(III), Electronic, IR and Raman spectra, Normal coordinate analysis

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