

COOPERATIVE PROCESSES IN THE FORMATION OF OXIDE REE-CONTAINING FUNCTIONALLY ACTIVE COMPONENTS FOR ADAPTIVE CONTROL SYSTEMS

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Complex system research of the interaction of structural components in nitrate systems of rare-earth and IA elements of the periodic system - precursors of modern multicomponent oxide polyfunctional materials on their basis - established the formation of a class of alkaline coordination nitrates of lanthanides. All of them are synthesized in monocrystalline form. Their composition, atomic-crystalline structure, forms of coordination polynuclears Ln, types of coordination of ligands, and a number of their properties were studied using a set of physico-chemical methods: chemical, X-ray diffraction, IR spectroscopy, crystallo-optical, thermographic, the generation of the second harmonic of laser radiation.

Obtained objective crystallochemical laws of the structure of this type of compounds deepen the understanding of: the chemical and physical properties of Ln, their composing ability; the possibility of the formation and existence in associated systems of associated new phases and their stability; the influence of the nature of lanthanides and alkali metals on the structure of complex anions and compounds in general; Individuality of Ln complexes; the existence of isotypic composition and structure of the groups of compounds on the natural rows of lanthanides and alkali metals; the role of NO_3^- groups in stereochemistry of this class of nitrates; the role of water in the formation of the closest environment of Ln^{3+} ions - complexing agents. The obtained data are the basis for detection, identifying, controlling the formed phases, determining the elemental composition and content of the samples, conducting analysis and comparing the phase state of objects in the preparatory stages of processing in innovative technologies using nitrate precursors of elements of different electronic

structures and various combinational methods of their activation, the establishment of technological and functional dependencies, the controlled modification of the properties of synthesis products.

The prospect of using this kind of precursors is the existence of a rather representative class (more than 70) of complex nitrate lanthanides, revealing among them the isotopic composition and structure of the groups of compounds of the representatives of Y, La - Lu; Li - Cs, a manifestation of a complex of technologically valuable properties inherent to them.

THE STUDY OF THERMOCHROMISM OF SOME TRIPHENYLMETHANE DYES IN DEEP EUTECTIC SOLVENTS

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Now, known only some number of studies indicates the possibility to use ionic liquids as solvents for thermochromic compounds. The thermochromic solvent-based systems exhibiting a reversible change in absorbance spectra as the temperature of the system is reversibly changed are described in [1, 2]. These systems include one or several transition metal ions, which experience thermally induced changes in the nature of the complexation or coordination around the transition metal ion(s) and, thereby, the system changes its color as the temperature changes. As for nature of the solvents, the authors of [2] indicate that they may be an aqueous, nonaqueous or ionic liquid; a plasticizer; a polymer; some additive(s) dissolved in a polymer; the matrix portion or phase of an organic, inorganic or hybrid gel; the liquid portion or phase of a gel; or some combination of these acting as co-solvents. The solution may be a free flowing or a viscous liquid, a non free flowing or thixotropic gel, or a solid or a semi-solid polymer. All of these solvents provide enough mobility for the ligands to transfer in and out of coordination with transition metal ions. It should be noted, however, that no