

**FEATURES OF TRANSFORMATIONS IN SYSTEMS OF NITRATE
PRECURSORS OF LANTHANOIDS AND ALKALINE METALS IN THE
FORMATION OF PHOTOCATALYTIC ACTIVE
NANO-LAYERED PEROVSKITE-LIKE PHASES**

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The report goes on to discuss and analyze the results of a study of the features of the common behavior of structural components in the systems of precursors of lanthanide nitrates and alkali metals at preparatory stages during the formation of REE-containing oxides with perovskite structure, pomegranate using "soft chemistry" and thermal activation.

One of the most promising classes of rare earth oxide and titanium complex oxide materials is nanostructured layered perovskite-like compounds (the Raddlesden-Popper, Dion-Jacobson phases) and solid solutions based on them.

New information on the reactivity and transformation of layered perovskite-like oxides, stabilization of photocatalytic and sensor-active crystalline modification of TiO₂ - anatase initiated the continuation of our research on this topic. And today the ways of managing the technical parameters of the target products through the choice of composition, synthesis conditions and processing method are being clarified.

Now, thanks to technological techniques of "soft chemistry" reactions, it has become possible to create substances with various structural features, to obtain metastable compounds by a sequence of low-temperature topochemical syntheses. Of particular interest in this regard are hybrid synthesis methods that combine the advantages of each of the methods used (elements of pyrolysis and hydrolysis synthesis methods, liver method, combustion of liquid nitrate precursors, sol-gel method) and use liquid nitrate precursors of elements of different electronic structures.

Ion exchange, intercalation and deintercalation, substitution and condensation processes, splitting processes, and mutual transformations of one structure to another are used to form the target phases (for example, the transition from the Raddlesden-Popper phase to the Dion-Jacobson phase; transition within one type of phases with increasing reducing the number of layers).

The empirical data obtained by the authors [1] on the conditions of formation and existence, on the peculiarities and regularities of the atomic-crystalline structure, properties, character and stability of thermal transformations of alkaline coordination nitrates of lanthanides play an important role in optimizing the development of technologies for the production of new multifunctional REE-containing materials. They are an important stage in the development of an experimental and theoretical scientific database on layered compounds and the processes involved; their unique properties, which are determined by the two-dimensional nature of the construction of the interlayer space, the distortion of the structure of titanium-oxygen octahedra of the perovskite layer and the high mobility of alkali metal cations.

¹References: O. Dryuchko, D. Storozhenko, A. Vigdorchik, N. Bunyakina, I. Ivanytska, K. Kytaihora, V. Khaniukov. *Molecular Crystals and Liquid Crystals*. (2018), 672(1), 199-214.