

SOME PHYSICO-CHEMICAL ASPECTS OF THE PREPARATORY STAGES OF THE FORMATION OF SELF-CLEANING PHOTOCATALYTICALLY ACTIVE COATINGS

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A complex systematic study of the interaction of structural components in cerium subgroup lanthanide nitrate systems and representatives of the IA group (Li, Na, K) of the elements of the periodic system - precursors of modern multicomponent oxide multifunctional materials based on them - established the formation of a representative class of alkaline coordination nitrates Ln. Their composition, formation conditions, atomic crystalline structure, forms of Ln coordination polyhedral, types of ligand coordination, a number of their properties were studied using a complex of physicochemical methods: chemical, X-ray phase, X-ray structural, IR spectroscopic, crystal-optical, thermo graphic, SHG laser radiation. The data obtained are the basis for identifying, identifying, monitoring the phase state of processing facilities in the preparatory stages when forming self-cleaning coating layers of building construction materials using innovative technologies using nanostructured composite systems of lanthanides and transition elements with photo catalytically active and hydrophilic properties, various combined methods of their activation and establishing technological and functional dependencies yaemogo modify the properties of the products obtained.

Photocatalytically active coatings are precipitated using a variety of technologies, such as sol-gel, spray pyrolysis, chemical or steam vapor deposition, and magnetron sputtering. Regulations are now being implemented using "solution burning" methods.

A promising class of photocatalytically active rare earth oxides and titanium oxide materials that can act as alternatives to existing developments are nanostructured layered perovskite-like compounds and solid solutions based on them. Depending on their composition and structure, they have a wide range of physicochemical properties. The perovskite-like layered titanates presented in this work belong to the homologous series $(Me, Ln)_{n+1}Ti_nO_{3n+1}$ – the Raddlesden-Popper phases, where Me is H, Li, Na, K, Rb, Cs; Ln – La, Nd; n is the number of perovskite nanolayers with a thickness of about 0.5 nm.

The obtained system of knowledge about transformation processes in systems of REE-containing nitrate precursors and crystal-chemical properties of samples of coordination nitrates Ln is of particular value in the formation of nanostructured layered perovskite-like compounds of lanthanides and transition elements (including their titanium); when establishing technological and functional dependencies between the method of preparation, the variability of the method of activation of technological systems, the methodology of production of the target product and its phase composition, lattice parameters, the specific surface area, the morphology of the constituent particles, the activity of layers of self-purifying compositions with hydrophilic structures and special structural elements; in practical implementation of innovative projects of decomposition of water for the purposes of hydrogen production, decomposition of toxic organic substances in solutions and air, incomplete oxidation of carbohydrates; upon receipt of other perovskite-like phases by ion exchange reactions and in other fields.