**Synthesis and adsorption characteristics of perovskite-based powders**

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Today, the complex oxide phases of LnLn'O3 (Ln, Ln '= REE) with the perovskite type structure, which possess a variety of electrical (high values of dielectric permeability constant), magnetic, magnetoelectric and optical properties (anisotropic optics) are of great practical interest. The REE compounds are used to create laser and other optically active elements in optoelectronics [1,2].

The process of obtaining optically transparent anisotropic ceramics based on perovskite type phase by means of coprecipitation involves the following steps: preparation of nitrate solutions of REE oxides (La2O3, Y2O3, R2O3 (R = Nd, Eu, Yb), dropwise addition of them to a solution of ammonia and urea, laundering, drying, obtaining of the precursor LaYO3:R, annealing, grinding, slip-casting under the magnetic field, sintering, obtaining a transparent anisotropic ceramic.

The investigation of the prepared nanopowders was carried out by the adsorption method and x-ray diffraction analysis. It was established that depending on the amount of added luminescent additive, the specific surface does not change monotonously. With the increase of Yb3+ particles in the system, the specific surface initially increases and then monotonically decreases. For Yb3+ the maximum is reached at 4 vol. %, for Eu3+ at 2 vol. %, and for Nd3+ at 1 vol. %.

Adsorption structural studies have shown that isoterms of nitrogen sorption on specimens with a maximum specific surface area belong to type IV isotherms according to the classification of Brunauer, Deming, Deming and Teller (BDDT), which characterizes them as mesoporous bodies. According to the classification of IUPAC the hysteresis loops can be classified as H2, which is characteristic of corpuscular systems. As follows from differential distributions, the introduction of different amounts of additives Yb3+ and Nd3+ contributes to the formation of similar porous structures with a narrow pore distribution in the range of 3.1 - 3.7 nm, which accounts for up to 60 % of the mesopores surface in the case of Yb3+ and up to 42 % in case Nd3+. When LaYO3 doped with europium oxide, the priority range of the formed porosity is shifted to a higher region of 4.9 - 7.1 nm. Mesopores specific surface of this range reaches 70 % of the specific surface.

1. Stability of interlanthanide perovskites ABO3 (A≡La–Pr; B≡Y, Ho–Lu) / Cristina Artini, Marcella Pani, Andrea Lausi // Journal of Physics and Chemistry of Solids. – 2016. – Vol. 91. – P. 93–100.
2. Artini Cristina. Crystal chemistry, stability and properties of interlanthanide perovskites: A review / Cristina Artini // Journal of the European Ceramic Society – 2017. – Vol. 37, Iss. 2. – P. 427–440.