СЕКЦИЯ «ГОРНОЕ ДЕЛО, ИНЖЕНЕРНОЕ ДЕЛО, ЭКОЛОГИЯ»

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ALUMINA CONTAINING WASTE PERSPECTIVE RAW MATERIALS FOR SYNTHESIS BARIUM ALUMINATE

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Ceramics from aluminate alkaline earth metals is an important material due to the unique properties developed by the barium aluminate phases, such as a quick set of strength even at low temperatures, high heat resistance, resistance to a wide range of aggressive effects, photosensitivity and bioactivity. Therefore, it is used in a wide range of applications, such as building industry, ceramics bindling in refractory cast products for steel industry, detectors, biomaterials and optical devices [1].

The use of waste and by-products of various industries contributes to not only fuel economy, electricity, and natural raw materials, but also significantly increases production. Also reduced areas allocated for careers and dumps suitable for agriculture, which leads to an improvement in the environmental state of the environment.

Over the past few decades, a variety of barium aluminate synthesis was used, including methods of hydrothermal, wet chemical method, method Pechini, solid state reaction, as well as sol-gel [2].

In this work, the sol-gel method was synthesized by barium mono aluminate. The sol-gel method allows the formation of the necessary phase formulations and structure of the material at lower temperatures.

Barium chloride hexahydrate $BaCl2 \cdot 6H_2O$, Barium nitrate hexahydrate $Ba(NO_3)_2 \cdot 6H_2O$, an alumina-contained spent catalyst that contains aluminum oxide 94–96 % as well as nitric acid and citric acid were used as a raw material. The resulting γ-form of aluminum oxide was crushed in agate mortar and dissolved with an aqueous solution of HNO_3. Prepared precursor, barium chloride hexahydrate $BaCl_2 \cdot 6H_2O$ or

barium nitrate hexahydrate $Ba(NO_3)_2 \cdot 6H_2O$ and citric acid dissolved in distilled water. The precursor solution was stirred on a magnetic stirrer at 70 °C to the formation of gel. The resulting gel was dried at 130 °C in a dryer for receiving xerogelies. Thus, the synthesized xerogel was burned at 1000 °C muffle furnace.

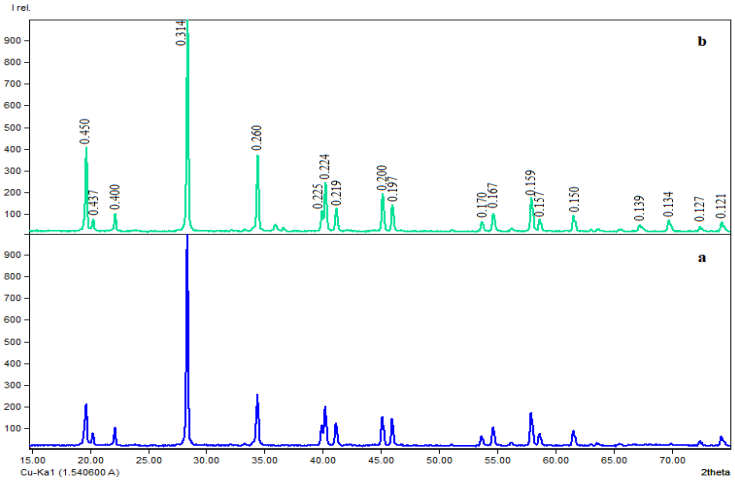

Fig. 1. – X-ray diffraction pattern of synthesized samples using different barium salts: a) $BaCl_2 \cdot 6H_2O$; b) $Ba(NO_3)_2 \cdot 6H_2O$

Data X-ray phase analyzes have shown that the maximum full of barium aluminate synthesis is positively affected by barium nitrate salts (Fig. 1a) at a temperature of 1000 °C than barium chloride (Fig. 1b).

Thus, in the course of experimental studies, optimal synthesis temperatures and the possibility of using aluminum-containing waste at different salts of magic in obtaining magnesium mono aluminum were determined.

References

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