

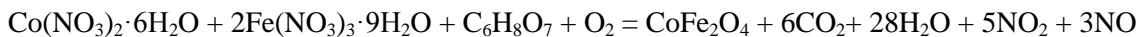
SYNTHESIS OF CUBIC FERRITE COFE₂O₄ BY SPRAY PYROLYSIS

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The purpose of this paper is to assess the prospects of using the method of spray pyrolysis for the synthesis of nanoscale powders of cubic and hexagonal ferrites for use in medicine and technology.

For the synthesis of cobalt ferrosin used reaction:



Aqueous solutions of cobalt nitric acid 6-aqueous, iron nitric acid 9-aqueous and citric acid with a concentration of 1M were used as reagents. After that they were mixed in accordance with the relationship:

$$\{[\text{Co}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}] : [\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}]\} : \text{C}_6\text{H}_8\text{O}_7 = \{1 : 2\} : 2$$

The concentrated ammonium hydroxide solution was added to the obtained solutions by drops with constant stirring on a magnetic stirrer until the pH = 2 value was reached, which was measured using a portable digital pH meter.

The initial solution using an ultrasonic nebulizer was transferred to the aerosol state, which was supplied through flexible tubes to the working zone of a tube furnace heated to a temperature of 1200 °C, after which the synthesis product was washed in a Drexel flask. Then, with the help of a permanent magnet, solid particles were deposited at the bottom of the container and dried. The industrial aspirator was used to regulate the aerosol flow rate through the working area of the furnace.

After spraying, the solution drops are heat treated, a tubular furnace is passed, whereby the solvent evaporates and a solid phase of the dissolved substance appears, which is then dried. Further heat treatment leads to the formation of porous particles, which are compacted during sintering.

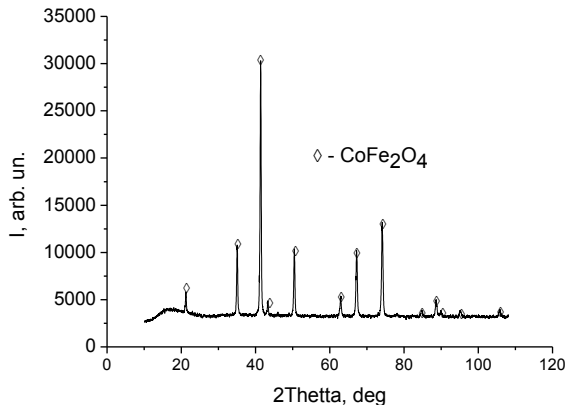


Fig 3. Synthesis product x-ray

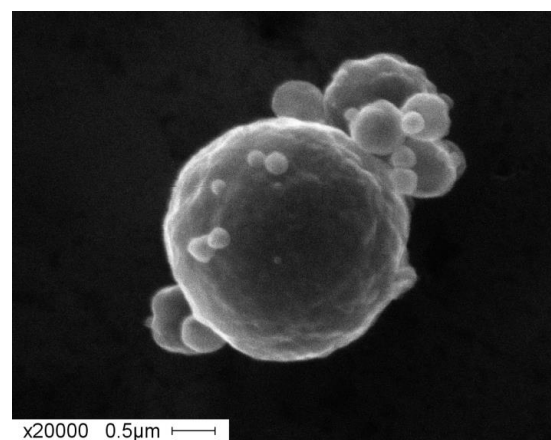


Fig 2. Microstructure of product

Thus, the use of the spray pyrolysis method for the synthesis of ferrite powders for medical and radio engineering purposes is of great scientific interest. Further research will be aimed at assessing the applicability of this method to obtain ferrites of other stoichiometric compositions (including hexagonal), the development of a synthesis methodology to obtain smaller particles, as well as to study the basic magnetic properties of synthesized powders.