

USAGE OF AC PLASMA TORCH FOR PRODUCTION OF OXIDE POWDERS

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The report deals with the synthesis of oxide materials in a plasma torch with separate injection of plasma-forming gas and solid aerosol of precursors. Thus, it is possible to provide a stability of the plasma torch operation and high degree of mixing of thermal plasma and precursors.

Oxide materials are actively used in a wide range of products, such as catalysts, filter materials, electrical devices (transformer cores), magnetic fluids for tomographic studies, etc. The main methods of their production are hydrothermal synthesis [1], coprecipitation [2], glycine-nitrate synthesis [3], gel-sol process [4], and also electric arc synthesis [5]. Usually plasma synthesis is carried out by mixing the flow of solid particles with the flow of thermal plasma in a plasma reactor. In the proposed method, a plasma torch with two feeding zones of plasma-forming media is considered: the near-electrode zone and the arc-burning zone. In the near-electrode zone the main air flow is fed, and a solid aerosol of the ground oxides with air is tangentially supplied to the arc-burning zone.

The composition and properties of the produced material were studied by energy-dispersive analysis, scanning electron microscopy, IR Fourier spectroscopy and X-ray phase analysis.

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