

Study on the Synthesis Conditions of Magnesium Diboride by Ultrasonic Spray Pyrolysis

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We studied on the synthesis condition of MgB₂ powder by ultrasonic spray pyrolysis method in order to decrease particle size for improving its flux pinning effect. The fine and spherical powders were fabricated from a solution including Mg and B ions by using spray pyrolysis. The dependence of solution concentration, furnace temperature and molar ratios of B and Mg were investigated during the synthesis process. The solution concentrations were varied from 0.05 to 0.2 mol/L and the reaction temperature was between 700 and 900°C. The synthesized particle size was smaller with decreasing concentration of starting solution and increased with raising furnace temperature. The average particle size showed narrow distribution ranging from 300nm to 500nm over the entire temperature range. In the moderate conditions of solution including B and Mg ion, the morphology of particles exhibited mostly spherical shapes and uniform distribution. The properties of synthesized powder were characterized by XRD, SEM, BET and TEM.

keywords : Spray pyrolysis, MgB₂, Flux pinning effect