

Production of Sr-Ferrite Sub-Micron Powder by Conventional and Sol-Gel Auto-Combustion Methods

Authors : M. Ghobeiti-Hasab

Abstract : Magnetic powder of Sr-ferrite was prepared by conventional and sol-gel auto-combustion methods. In conventional method, strontium carbonate and ferric oxide powders were mixed together and then mixture was calcined. In sol-gel auto-combustion method, a solution containing strontium nitrate, ferric nitrate and citric acid was heated until the combustion took place automatically; then, as-burnt powder was calcined. Thermal behavior, phase identification, morphology and magnetic properties of powders obtained by these two methods were compared by DTA, XRD, SEM, and VSM techniques. According to the results of DTA analysis, formation temperature of Sr-ferrite obtained by conventional and sol-gel auto-combustion methods were 1300 °C and 1000 °C, respectively. XRD results confirmed the formation of pure Sr-ferrite at the mentioned temperatures. Plate and hexagonal-shape particles of Sr-ferrite were observed using SEM. The Sr-ferrite powder obtained by sol-gel auto-combustion method had saturation magnetization of 66.03 emu/g and coercivity of 5731 Oe in comparison with values of 58.20 emu/g and 4378 Oe obtained by conventional method.

Keywords : Sr-ferrite, sol-gel, magnetic properties, calcination

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