Structural and magnetic properties of aluminum substituted yttrium iron garnet via sol-gel synthesis

ABSTRACT

Aluminum-substituted yttrium iron garnet (Al-YIG) powders was synthesize by using sol-gel citrate nitrate combustion technique with different doping concentration (x = 0.4, 0.6 and 1.0). The Y3-x Alx Fe5O12 samples were analyse of phase, structural and hysteresis by using X-ray diffraction (XRD), Fourier transform infra-red (FTIR) and Vibrating Sample Magnetometer (VSM).The powder resulted a single phase nanostructured garnet was formed. Room temperature saturation magnetization Ms and coercivity of Al-YIG powders decreased as a function of increasing Al content. The samples has a room temperature Ms of 9.2 emu/g and decreased to 1.5 emu/g. Coercivity Hc value decreases from 71.7 G to 51.4 G.

Keyword: Aluminum-substituted yttrium iron garnet (Al-YIG) powders