

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

ABSTRACT

Aluminum-substituted yttrium iron garnet (Al-YIG) powders was synthesized by using sol-gel citrate nitrate combustion technique with different doping concentration ($x = 0.4, 0.6$ and 1.0). The $Y_{3-x}Al_xFe_5O_{12}$ samples were analyzed 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 M_s and coercivity of Al-YIG powders decreased as a function of increasing Al content. The samples has a room temperature M_s of 9.2 emu/g and decreased to 1.5 emu/g . Coercivity H_c value decreases from 71.7 G to 51.4 G .

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