Synthesis, characterization and effects of citric acid and PVA on magnetic properties of $CoFe_2O_4$

ABSTRACT

Cobalt ferrite ($CoFe_2O_4$) particles were synthesized by sol-gel method using metal nitrates, citric acid (CA) and polyvinyl alcohol (PVA). X-ray diffraction (XRD), high resolution scanning electron microscopy (HR-SEM), thermogravimetry/differential scanning calorimetry analysis and vibrating sample magnetometer were used to study the structural, thermal and magnetic properties of the $CoFe_2O_4$ powder. XRD results indicate that the resultant particles have crystalline, pure single phase spinel structure. From HR-SEM images, a systematic decrease in particle size is observed with an increase in PVA concentration, along with addition of CA. CA at various concentrations of PVA significantly enhance the magnetic properties of the materials.

Keyword: Chemical synthesis; Magnetic materials; Magnetic properties; Thermogravimetric analysis