ABSTRACT

Nanosized spinel ferrites have attracted considerable attention for their interesting structural, magnetic and electrical properties. The physical and chemical properties of nanomaterials have been enhanced because of their surface-to-volume ratio. To search for new good gas-sensing materials and the new properties of conventional materials has become an active research field. Magnesium ferrite is a most versatile ferrite, due to its high resistivity and low eddy currents. Also the technological importance of cobalt ferrite has motivated several studies on the synthesis as well as the physical properties of this material. Hence an attempt is made to synthesize cobalt doped magnesium ferrite nanoparticles (Mg0.6Co0.4Fe2O4) by co-precipitation method. Magnesium chloride (MgCl 2.6H2O), Cobaltous Chloride (CoCl2.6H2O), anhydrous Ferric Chloride (FeCl3) along with sodium hydroxide (NaOH) is used as raw materials. Magnesium-Cobalt ferrite sample annealed at 600 ○ C are subjected to X-ray diffraction to calculate the average nano-crystalline size using Debye - Scherrer formula and is found to be 2-4 nm. The FT-IR spectrum of the sample is recorded and the characteristic absorption bands are observed at 578 cm -1 and 406 cm -1 corresponding to tetrahedral and octahedral sites respectively. The morphological analysis of the sample is studied using Scanning Electron Microscope (SEM). The magnetic properties of the cobalt doped magnesium ferrite nano particles are studied using Vibrating Sample Magnetometer (VSM) and the magnetic properties are found to be improved due to cobalt doping.