**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 [MgCl2.6H2O], 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. The FT-IR spectra of the sample are recorded to ensure the presence of the metallic compounds. 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).