**Abstract**

The study of transition metal ferrites has vast applications from microwave to radio-wave frequencies and is of great importance from both fundamental as well as in research aspect. Based on their magnetic properties, transition metal ferrites are found to have low magnetic anisotropies and are magnetically categorized as soft. Manganese ferrites are a group of soft spinel ferrite materials with high magnetic permeability, high electrical resistance and low loss. The doping of molybdenum improves its resistivity, strength and toughness. Due to their excellent electrical and magnetic properties, spinel ferrites are technologically important ceramic materials. As transition takes place from micron to nano regime, these materials are found to be with excellent chemical stability, moderate saturation magnetization and low eddy currents especially in spinel ferrites. In this present work, nanocrystalline ferrites of x varies as 0.4, 0.6 and 0.8 are synthesized by hydrothermal method. The prepared nanocrystalline ferrites are characterized by X-Ray Diffraction (XRD), Fourier Transform Infrared Spectroscopy (FT-IR), Energy Dispersive X-Ray Analysis (EDX) and Scanning Electron Microscopy (SEM) for analyzing its structural, functional groups and morphological structures. XRD analysis reveals that the resultant ferrite nanoparticles are found to have cubic structure. FT-IR spectral analysis shows two main broad metal-oxygen bands and confirms the presence of spinel ferrites. EDX analysis confirms the quantitative presence of elements without impurities. This study aims to fabricate the ferrites with better physical and magnetic properties that are useful in a variety of applications such as magnetic sensors, heavy metal removal and transducers. *.*