Room temperature measurements of physical and magnetic characteristics of Co0.4Ni0.3Zn0.3Fe2O4 polycrystalline material prepared using mechanically alloyed. Nanoparticles

ABSTRACT

Co0.4Ni0.3Zn0.3Fe2O4 ferrites material with the crystallite size in the size range 10-50 nm was prepared using mechanical alloying and sintering. The structure and morphology of samples were studies. The initial permeability (μ') and permittivity (ß') has been studied as the functions of frequency and the sintering temperatures sintering temperature using a network analyzer from 10 MHz to 1.8 GHz. X-ray diffraction confirmed the formation of spinel structure and a scanning electron micrograph was used to analyze the grain size distribution of ferrite. The permeability spectra of the resulting ferrite samples shows increasing values with the increasing sintering temperature, this is attributed to the grain growth as a result of the sintering process. Permittivity ß' also increases with increasing average grain size, which may be ascribed to the increase in an increase in the Fe2+ concentration formed at elevated sintering temperature.

Keyword: Mechanical alloying; Ferrite; Permeability; Permittivity; Sintering temperature.