

Dielectric permittivity of nickel ferrites at microwave frequencies 1 MHz to 1.8 GHz

ABSTRACT

NiFe₂O₄ prepared via the sol–gel technique were pre-sintered at 900 °C and synthesized at different sintering temperatures from 1,000 °C to 1,200 °C at 100 °C intervals. The samples were characterized for microwave dielectric properties. These samples were measured using Agilent Impedance/Material Analyzer at frequencies 1 MHz to 1.8 GHz. Results showed a decrease in the dielectric constant and loss factor with frequency except at the turning point, around 150 MHz, where the loss factor showed a gradual increase. However, both the dielectric constant and loss factor increase with increasing sintering temperature. The grain size and density also increased with increasing sintering temperature, but the porosity and grain boundary density showed a decrease.

Keyword: Dielectric constant, Loss factor, Grain boundary, Porosity, Sintering, Dielectric permittivity, Nickel ferrites