Synthesis, magnetic properties and microstructure of Ni–Zn ferrite by sol–gel technique

Abstract

In the study, the Ni–Zn ferrite powder of a Ni0.3Zn0.7Fe2O4 composition was synthesized by sol–gel route using metal acetates at low temperatures. Both the scanning electron microscope and X-ray diffraction analyses of various gel samples heated at different temperatures were used to identify the reaction stages where the amorphous-gel-to-crystalline phase transition occurred. The electrical, magnetic and microstructural properties of the toroidal cores were studied. It was found that the initial permeability increased with a large frequency band (0.1–31.39 MHz) and the magnetic loss was small. The electrical resistivity was higher as compared to the ones which were obtained by the conventional process. Therefore, well–defined polycrystalline microstructure nickel–zinc ferrite and a short processing time of gel preparation have become the major achievements of this study.

Keyword: Sol–gel preparation, Magnetic properties, Acetic acid, Microstructure, Sintering