

Preparation of Ni–Zn–Cu ferrite particles by sol–gel technique

Abstract

Ni–Zn–Cu ferrite powders of $\text{Ni}_{0.3}\text{Zn}_{0.6}\text{Cu}_{0.1}\text{Fe}_2\text{O}_4$ composition were synthesized by sol–gel method at low temperatures. Scanning electron microscope (SEM) and X-ray diffraction (XRD) analyses of various gel samples heated at different temperatures helped in identifying the reaction process and the stages where amorphous-gel-to-crystalline phase transition occurred. The powders were used to make ferrite cores and their microstructure was compared with those obtained by the classic ceramic process. The spinel cubic structure Ni–Zn–Cu ferrite was found to form at the temperature of 700 °C with a calcination time of 4 h. Short processing time of gel preparation, homogeneity and well defined polycrystalline microstructure with small grain size were achieved in this study.

Keyword: Sol–gel preparation, Microstructure, Acetic acid, Sintering, Grain boundaries, Initial permeability