Fabricating sub-micro grain sized NiCuZn ferrite with high performance from nanopowders

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Abstract

Abtract: NiCuZn ferrite has been used as one of the most important soft magnetic medium materials in various types of electronic devices for information technology (IT) such as multi-layer chip inductor (MLCI). With the rapid growth of market demand and requirement for miniaturization, high volumetric efficiency, high performance, high reliability and low cost, materials will be improved in many cases and the use of nano-size particles will be necessary. In this paper, a novel and economical methodcitrate precursor method was developed to synthesize nano-siezd and highly reactive NiCuZn ferrite powders. The synthesized powders can be sintered under 900oC to reach high density. In order to control grain size, a novel two-step sintering technology was used during the low temperature firing processing of the nano-sized ferrite powders. The size effect and the influence of Mn dopant on the microstructures as well as magnetic properties were investigated. Sub-micro grain sized NiCuZn ferrites with high performance were obtained, showing high initial permeability up to 1000 and high resistivity above 1010ohm·cm, two order than that prepared by conventional ceramic method.