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Effect of boron substitution on the properties of NiZnCu ferrite for multilayer chip inductors

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ABSTRACT

The initial permeability of the toroidal core sample with boron substituted NiZnCu ferrite ($\text{Ni}_{0.36}\text{Zn}_{0.44}\text{Cu}_{2.2-\text{Fe}_{1.96-x}\text{B}_x\text{O}_4}$ ($x = 0.0, 0.2, 0.4, 0.6, \text{ and } 0.8$)) which was annealed at 900 °C for 2 h decreased from 162.4 to 123.2 as boron concentration x is increased from 0.2 to 0.8. The quality factor and density of 0.2 mol% boron substituted NiZnCu ferrites sintered at 900 °C for 2 h was about 240.0 and 4.84 g/cm³, respectively. The density, shrinkage and saturation magnetization were increased with increasing annealing temperature. It was shown that the boron substituted NiZnCu ferrite systems were promising as a high quality factor material in the fabrication of multilayer chip inductors (MLCIs).