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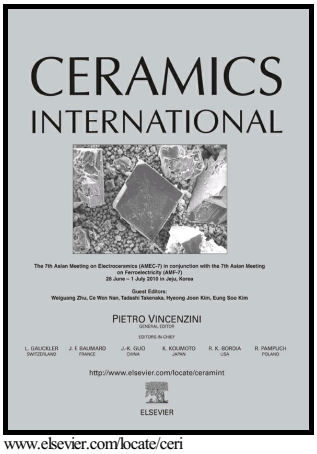

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Monodomain MgCuZn ferrite with equivalent permeability and permittivity for broad frequency band applications

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Abstract

In order for the miniaturization of a broadband antenna to be achieved, monodomain $Mg_{0.78}Cu_{0.2}Zn_{0.02}Fe_{1.96}O_{3.94}$ ferrites with various microstructures were prepared by conventional solid-state reaction method. The effect of microstructure on the magnetic and dielectric properties was studied. The results displayed that monodomain MgCuZn ferrite is a potential magneto-dielectric material for broad frequency band applications. In addition, grain size and porosity apparently influenced the permeability and permittivity spectra of the monodomain ferrite. Specifically, densely sintered MgCuZn ferrites with an average grain size of 1.41 μm displayed equivalent permeability and permittivity (such as μ' and $\varepsilon' \sim 13$), as along with a low loss factor (such as $\tan \delta_\mu < 0.02$, $\tan \delta_\varepsilon < 0.005$) in a fairly wide frequency range extending from 10 MHz to 100 MHz.

Keywords