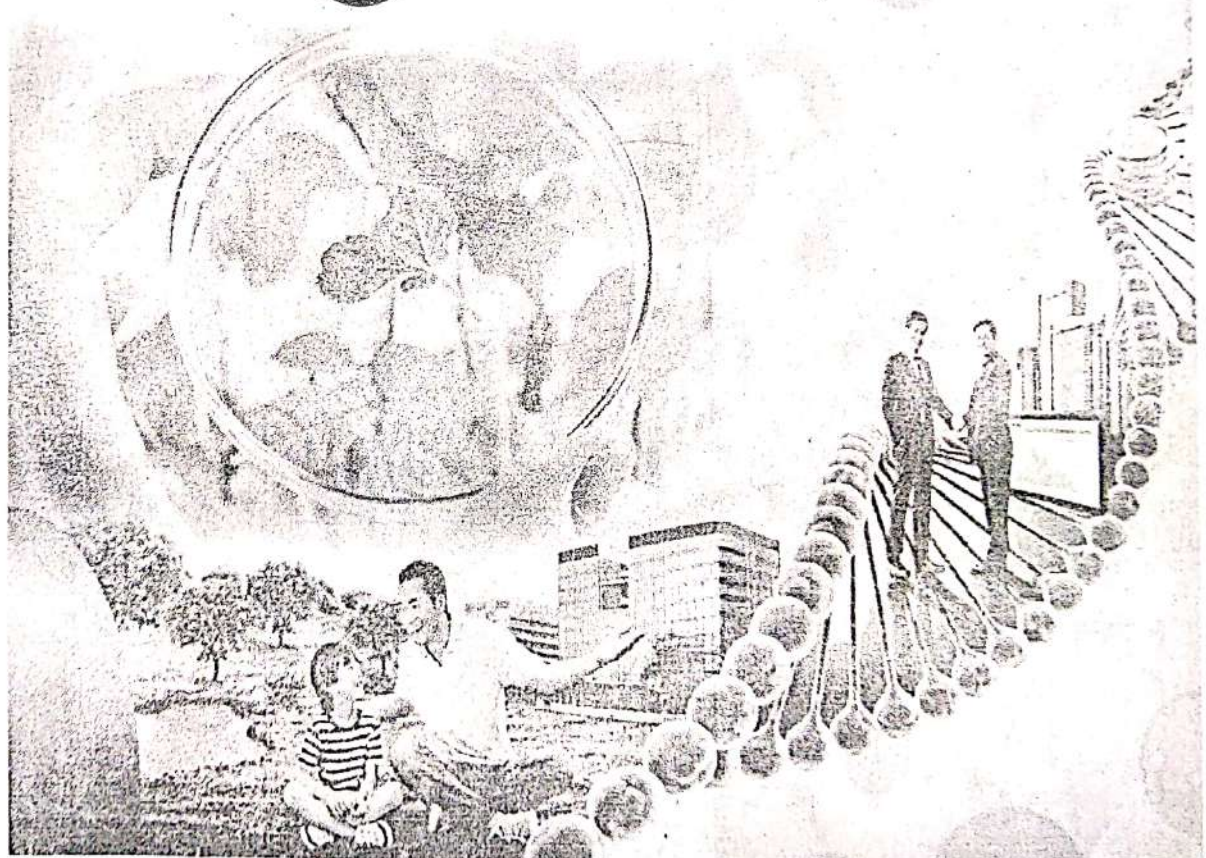


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Synthesis and Study of Ni²⁺ substituted Mg-Cu-Zn ferrite Nanomaterials by molten salt method

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ABSTRACT:

Spinel ferrites with general chemical formula $Mg_{0.25-x}Ni_xCu_{0.25}Zn_{0.5}Fe_2O_4$ where $x=0.0$ to 0.25 in step 0.05 . Were prepared by molten salt method. The effect of substitution of Ni²⁺ on structural and microstructural properties of Mg-Cu-Zn ferrite have been studied for the use in multilayer chip inductor (MLCI) applications.

The lattice parameter shows a gradually increased values with increasing Ni²⁺ content, which is attributed to larger ionic size of Ni²⁺ (0.69 \AA) which replaces Mg²⁺ (0.65 \AA). The crystallite size has been estimated by the Deby-Scherrer formula using the full width at half-maximum (FWHM) of the line broadening of the (311) reflection and it is found to be in the range of (45-49nm). The grain size determined from Scanning electron microscope (SEM). The dense micro structure is observed with the average grain size of $0.91-1.03 \mu m$. The chemical compositions of present systems have been calculated by Energy Dispersive Spectrum (EDS). With improvement in the values of the above-mentioned properties, the synthesized materials could be suitable for potential application in some magnetic and microwave devices.

Key words: Mg-Cu-Zn ferrite, XRD, SEM, EDS.