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Patent Search

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| Invention Title | A METHOD FOR STRUCTURAL AND ELECTRICAL INVESTIGATION OF HYDROTHERMALLY SYNTHESIZED CO-DOPED LITHIUM FERRITES |
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Abstract:

ABSTRACT The present invention describes a method for Structural and Electrical Investigation of Hydrothermally synthesized Co-doped Lithium Ferrites. In the present invention we report the synthesis of cobalt doped Lithium nano ferrites ($\text{Li}_{0.5-0.5x}\text{Co}_x\text{Fe}_{2.5-0.5x}\text{O}_4$, where $x = 0.1, 0.1, 0.2, 0.3, 0.4$) by employing the Hydrothermal approach. The X-Ray diffraction (XRD) pattern shows the formation of cubic spinel ferrite structure where crystallite size is observed to decrease from 86nm to 44nm whereas, lattice parameters increase from 8.354Å to 8.397Å with the increase Co^{2+} ions concentration. The lattice also increases from 0.00131 to 0.00253 which is related to the decrease in crystallite size. The Scanning Electron Microscopy (SEM) results shows the formation of irregular shaped grains with clearly visible grain boundaries where the grain size varies between 210nm to 702nm. The Complex Impedance Spectroscopy (CIS) shows the compositional dependence of and with respect to frequency.

Complete Specification

DESC:FIELD OF INVENTION:

This invention generally relates to the field of the wireless technology, communication between the devices with different types of antennas (patch antennas) systems, assemblies, techniques and methods, and more particularly relates to a method for Reduction of V- folding effect to improve performance of flexible Kapton Substrate.

BACKGROUND OF THE INVENTION

Spinel nanoferrites are widely discussed and studies nanoparticles due to their remarkable structural, electrical, and magnetic properties. Due to superior electrical and magnetic characteristics, they have wide range of applications such as magnetic transporters for drugs, high density information devices, high frequency applications, waste water treatment, electronic devices, gas sensors etc. In comparison to other spinel ferrites, Lithium ferrite is a promising candidate as it possesses high curie temperature (), excellent dielectric properties, high saturation magnetization and squarer hysteresis loop. Due to these properties, it has potential applications in circulators, phase shifters, isolators, power transformation in electronics, memory cores, antennas, and high-speed digital tapes. Lithium ferrite possesses a spinel type crystal structure with general formula of AB_2O_4 ($\text{Li}_{0.5}\text{Fe}_{2.5}\text{O}_4/\text{LiFe}_5\text{O}_8$), where metal cations (Li^+ and $\text{Fe}^{2+/3+}$) are distributed over tetrahedral site (A-site) and octahedral site (B-site). The distribution of Li^+ ions and $\text{Fe}^{2+/3+}$ ions play an important role in determining the physical characteristics of Lithium ferrite. It has been observed that lithium is very volatile and produce cation defects, secondary phases, and lithium deficiencies in the crystal lattice. Thus, doping of lithium ferrite is one of the prominent methods to improve its physical, electrical and magnetic properties and to remove the shortcomings of lithium ferrite.

In this regard, Srivastava et al (2014) doped the lithium ferrite with chromium using sol-gel method at different pH. They obtained the pure structure at the pH of 9.5. They also observed that at higher pH, the B-site is preferable for Fe^{3+} ions than the A-site and due to this preference magnetic properties improved at higher pH. Further, Al, Ni

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