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Enhanced critical frequency of Ni and Mg co-substituted Lithium ferrites for microwave applications

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$\text{Li}_{1-x}\text{Ni}_x\text{Mg}_x\text{Fe}_{2.5-x}\text{O}_4$ ferrite system is synthesized from solid state reaction method ($x = 0.00$ to 0.25 , each step is 0.05). The operational frequency is shifted to higher values with substituent concentration(x) in lithium ferrite. The natural resonance frequency has been observed to be enhanced 106 MHz to 1 GHz for the concentration of $x > 0.10$. Snoek product varies in proportion with M_s . Cation distribution is proposed from saturation magnetization and XRD studies, and verified from FTIR and electromagnetic properties. The variations of electromagnetic properties are explained by suggesting the transfer of Mg ions to tetrahedral site ($x > 0.10$). The selected composition offered new possibilities in the solid state synthesis for enhancing the critical frequency.

Topics

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