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## Investigation of magnetic and electrical properties of Mn-Mg co doped NiFe<sub>2</sub>O<sub>4</sub> prepared via hydrothermal process.

Wednesday, 1 September 2021 12:00 (30 minutes)

Effect of Mn-Mg co-doped NiFe<sub>2</sub>O<sub>4</sub> with composition Ni<sub>0.5-x</sub>Mn<sub>x</sub>Mg<sub>0.5</sub>Fe<sub>2</sub>O<sub>4</sub> (x=0, 0.1, 0.2, 0.3, 0.4) was prepared by the hydrothermal method. All the samples were sintered at 900 °C for 3 hours and after appropriate heat treatments, their structural, electrical, and magnetic properties were investigated by using XRD, FESEM, TEM, FTIR, DC resistivity, and VSM respectively. XRD confirmed the formation of the spinel phase along with the increase in the crystallite size from 28 nm to 48 nm as the dopant concentration increased up to x=0.4. Both FESEM and TEM confirmed the formation of spherical grains. Similarly, FTIR spectroscopy also confirmed the strong metal bond in tetrahedral (A-site) and octahedral site (B-site) which again gave strong evidence of the formation of spinel phase. Magnetic properties like the retentivity (Mr), saturation magnetization (Ms), and coercivity (Hc) were reduced quite sharply and were found below 10 emu/g, 27.78 emu/g, and below 160 Oe. On the other hand, the Curie temperature (T<sub>c</sub>) was found to reduce from 189 °C to 178 °C whereas the sharp increase in the DC resistivity along with the activation energy of 0.37 eV was observed. The observed magnetic and electrical properties of such material make them a suitable candidate for high-frequency applications where eddy current losses become appreciable.

Key Words: Ferrite, Sintering, Magnetic properties, Resistivity

### Is this abstract from experiment?

No

### Name of experiment and experimental site

N/A

### Is the speaker for that presentation defined?

No

### Details

N/A

### Internet talk

Yes

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