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Structural and Magnetic investigation of Cu²⁺ substituted Mn-Zn spinel ferrite synthesized using hydrothermal route

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Abstract

Spinel Ferrites are investigated for different applications in the field of electronics such as information storage devices. The properties of these spinel ferrites vary with the changes in the different compositional elements. With this aim super paramagnetic Mn_{0.25}Zn_{0.5}Cu_{0.25}Fe₂O₄ and Mn_{0.2}Zn_{0.5}Cu_{0.3}Fe₂O₄ ferrite was successfully prepared by using a hydrothermal approach at temperature of 180°C for 20 hrs. The resulting compounds shows different structural and magnetic evolution as inspected from various analytical techniques such as XRD, FTIR, VSM. XRD. The impact on the crystallite size calculated using Debye Scherrer's formula for (311) reflection is discussed in results. The VSM gives magnetic parameters of synthesized SFNPs with a smooth S-shaped MH-curve representing the super paramagnetic nature with minimum squareness ratio 0.13 and 0.08, indicating pseudo-single domain in nature.



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