

## Impact of Temperature Variation on Magnetic Properties of N Doped Spinal Nickel Ferrite with Graphene

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**Abstract :** Simple hydrothermal method to synthesize new nanocomposites consisting of nitrogen-doped graphene and  $\text{NiFe}_2\text{O}_4$ . By analyzing the X-Ray Powder Diffraction (XRD) images, we confirmed that the  $\text{NiFe}_2\text{O}_4$  phase is pure and has a Face Centered Cubic (FCC) structure. The average size of the  $\text{NiFe}_2\text{O}_4$  nanoparticles is approximately  $40 \pm 2$  nm. Additionally, we used X-ray photoelectron spectroscopy (XPS) to study the surface chemical composition and cation oxidation states of both the  $\text{NiFe}_2\text{O}_4$  nanoparticles and the nitrogen-doped graphene/ $\text{NiFe}_2\text{O}_4$  nanocomposites. A magnetic interaction between nitrogen doped graphene/ $\text{NiFe}_2\text{O}_4$  was studied. Increases in hydrothermal synthesis temperature lead to the improved crystalline structure of  $\text{NiFe}_2\text{O}_4$  nanoparticles, which improves the magnetic properties.

**Keywords :** nickel ferrite spinal, nitrogen doped graphene, magnetic nanocomposite, hydrothermal synthesis

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