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### Dependence of pH and temperature effect in the synthesis of $\text{Fe}_3\text{O}_4$

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**Abstract :**  $\text{Fe}_3\text{O}_4$  nanoparticles were synthesized via chemical co-precipitation method using *Hexamethylenediamine* ( $\text{C}_6\text{H}_{16}\text{N}_2$ ) as a precipitating agent and a base. It was found that the value of pH and temperature influences the reaction mechanism for the formation of  $\text{Fe}_3\text{O}_4$  nanoparticles. The obtained nanoparticles was characterized by X-ray diffraction (XRD), Fourier transform infrared spectrometer (FT-IR), Field emission scanning electron microscopy (FE-SEM), Field emission transmission electron microscopy (FE-TEM) and thermo gravimetric analysis (TGA), their magnetic study was analysis by vibrating sample magnetometer.

**Keywords.**  $\text{Fe}_3\text{O}_4$  nanoparticles, pH and temperature, co-precipitation.

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