



# Mössbauer and magnetization studies of nickel ferrite nanoparticle synthesized by the microwave-combustion method

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## Abstract:

Nanocrystalline nickel ferrite was synthesized from its stoichiometric metal nitrates and urea mixtures, using a microwave assisted combustion method. The process was convenient, inexpensive and efficient method for formation of NiFe<sub>2</sub>O<sub>4</sub> nanomaterials. Effect of urea/metal nitrates ratio on the obtained phases, particle size and magnetic properties has been investigated by various techniques. Saturation magnetization of 50 emu/g was observed at room temperature (RT) for larger particles, and it decreases with decreasing particle size. The coercivity attains a maximum value of 170 Oe when the particle size was ~ 20 nm, and decreases with increasing particle size. Mössbauer spectra measured at RT for some representative samples show a combination of ordered and superparamagnetic behavior, whereas those collected at 20 K elucidate the nature of the obtained phases and cation distribution.

## Keywords:

Combustion method Nickel ferrite Nanoparticle Magnetic property Mössbauer spectroscopy

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