**Role of heat treatment on the energy band gap of nickel oxide nanoparticles & its efficacy in antibacterial activity**

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**Abstract**. This article reports the crucial impact of heat treatment on crystalline size, phase, and energy band gap of nickel oxide nanoparticles synthesized at different molar concentration reported earlier [1, 2]. These NiO nanoparticles were annealed from 300°C to 900°C. Structural characterization has been done using X-ray diffraction of each sample, which determines the phase of nickel oxide nanoparticles with isochronal annealing. The average crystalline size of nickel oxide nanoparticles was found to be ~26.2 nm. The pure phase of nickel oxide nanoparticles was obtained at 900oC that is also confirmed by Raman spectra [3]. A blue shift is observed in Raman spectra implying more interaction of an incident photon with phonons. Vibrational properties show the augmentation inthe intensity with the rise in temperature due to enhancement in grain size. UV-Visible spectroscopy determines the direct variation of the band gap in the range of 2.14 eV - 3.37eV with varying crystallite size due to alteration in annealing temperature or may be due to surface & interface effect [4, 5]. It also exhibits excellent antibacterial activity when treated with *Salmonella Sp* gram-negative bacteria, which shows 10 mm inhibition diameter.

References:

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