Investigation of sensing properties of cobalt doped nickel-ferrite nanostructures synthesized by microwave method

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Abstract: In this work, Cobalt doped Nickel Ferrite nanostructures (Ni$_{1-x}$Co$_x$Fe$_2$O$_4$; (x = 0.0, 0.05, 0.15, 0.2, 0.3) were synthesized by Microwave assisted combustion method and then the powder obtained was pressed to form disk shape sample with 2.5cm in diameter. The samples were annealed at 700°C for 4 h. Structure, surface morphology and gas sensing properties of the samples were studied using X- ray diffraction (XRD), Filed Emission Scanning Electron Microscope (FESEM) and Gas Sensing Reactor (GSR). The XRD spectra of the samples indicate the formation of spinal phase. Sensors response at different temperatures were investigated for acetone gas (2500ppm) and the results indicate that the optimum work’s temperature for samples is about 300°C. The results showed that the as grown samples have the higher response compared to the annealed samples. The maximum response achieved in sample with %5 Cobalt doping.

Keywords: Nanostructure, Nickel Cobalt Ferrite, Microwave, Gas sensor, Acetone

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