

## **SYNTHESIS AND CHARACTERIZATION OF NICKEL MANGANESE OXIDE NANOPARTICLES BY THERMAL TREATMENT METHOD**

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### **ABSTRACT**

Zero dimensional nanomaterials such as nanoparticles, quantum dots and metal oxide nanocrystals of less than 100 nm in dimension are attracted considerable attention in recent years because of their excellent physical and chemical properties that are different from their respective bulk counterparts. In particular spinel metal manganese oxides or manganites nanoparticles are important class of mixed-metal manganese oxides, owing to their diverse properties such as photocatalytic and electrochemical properties. In this research, nickel manganese oxide ( $\text{NiMn}_2\text{O}_4$ ) nanocrystals were synthesized by a thermal treatment method. The method followed by calcination at various temperatures from 450 to 950°C. In this investigation, we used polyvinyl pyrrolidone (PVP) as a capping agent to control the agglomeration of the nanoparticles. The characterization studies were conducted by X-ray diffraction (XRD) to generate diffraction patterns of crystalline samples at room temperature. The Fourier transform infrared spectroscopy was used to confirm the presence of metal oxide bands at all temperatures and the absence of organic bands at 950 °C. The magnetic properties were measured using an electron spin resonance (ESR).

*Keywords: nanoparticles; manganese oxides; thermal treatment;*

<http://journal.masshp.net/all%20journal/VOLUME%2021%20No%201%20&%202%202013/05%20N.%20Ahad%2031-38.pdf>

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