

# Modification of Layered Structure in Manganese Oxide Nanorods for Electrode of Supercapacitor

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## Abstract:

One-dimensional of layered structure manganese oxide ( $\text{MnO}_2$ ) has been synthesized via hydrothermal route without further heat treatment. Varying the hydrothermal route parameter has an effect on the layered structure of  $\text{MnO}_2$ .  $\alpha$ - $\text{MnO}_2$  obtained in this study has been physicochemical characterized using X-Ray diffraction (XRD), Fourier Transmission Infra-Red (FTIR), Field Emission Electron Microscopy (FESEM), Transmission Electron Microscopy (TEM) and Selected Area Electron Diffraction (SAED). Its electrochemical property has been evaluated by performing cyclic voltammetry using potentiostat. From the electrochemical analysis, it was shown  $\text{MnO}_2$  with larger layered structure having high specific (Cs) compared to that of  $\text{MnO}_2$  with smaller layered structure. This high CS is originated from a combination of electrochemical double layer and pseudo-capacitance storage mechanisms. Besides, the appearance of water molecules within the layered spacing assisted the cations diffusion process.

**Keywords:** A- $\text{MnO}_2$ ; Hydrothermal; Supercapacitor; Layered structure; Nanorods

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