

**SYNTHESIS AND CHARACTERIZATION OF ACTIVATED  
CARBON DOPED TITANIUM DIOXIDE NANOPARTICLES  
FOR SUPERCAPACITOR**

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## ABSTRACT

### SYNTHESIS AND CHARACTERIZATION OF ACTIVATED CARBON DOPED TITANIUM DIOXIDE NANOPARTICLES FOR SUPERCAPACITOR

AC doped TiO<sub>2</sub> nanoparticles were synthesis via ultrasonic assisted sol-gel method which are utilized as supercapacitor materials. The electrochemical properties of the AC/TiO<sub>2</sub> nanoparticles were investigate using Cyclic Voltammetry (CV) analysis. The crystal structure of the composite has been characterized by X-ray diffraction analysis (XRD) and Fourier transform infrared spectroscopy (FTIR). The electrochemical measurements reveal that the specific capacitance of 267.910 and 226.190 Fg<sup>-1</sup> have been obtained for 20% TiO<sub>2</sub> loading at 50 and 100 mVs<sup>-1</sup> respectively with good capacity retention, as it maintained 90% of its original capacitance after 100<sup>th</sup> subsequent cycles. The XRD pattern confirmed the purity of AC/TiO<sub>2</sub> nanoparticles and the crystallite sizes of AC/TiO<sub>2</sub> in composites were smaller than the undoped samples. The FTIR analysis reveal that the presence of carbonyl group of AC/TiO<sub>2</sub> nanoparticles is advantageous to fast faradaic reactions resulted good capacitance. Therefore, results demonstrated that the AC/TiO<sub>2</sub> nanoparticles is a promising electrode material for supercapacitor application.

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