

# **Polyaniline and manganese oxide decorated on carbon nanofibers as a superior electrode material for supercapacitor**

## **ABSTRACT**

A novel ternary composite of carbon nanofibers/polyaniline-manganese oxide (CNFs/PANI-MnO<sub>2</sub>) was synthesized via electrospinning, carbonization followed by electrodeposition of PANI-MnO<sub>2</sub>. The CNFs/PANI-MnO<sub>2</sub> composite exhibited excellent specific capacitance of 937.66 F/g at a scan rate of 5 mV/s and good cyclic stability with capacitance retention of 97.6% after 5000 consecutive cycles. The composite also exhibited superior performance with a specific energy of 66.12 Wh/kg at a specific power of 470.81 W/kg with low charge transfer resistance,  $R_{ct}$  (1.81  $\Omega$ ) and equivalent series resistance (32.18  $\Omega$ ) indicating high electronic conductivity. Three symmetrical CNFs/PANI-MnO<sub>2</sub> composites assembled in series using coin cells have successfully lighted up a red-light emitting diode (LED), proving its outstanding supercapacitive performance as an excellent electrode material for supercapacitors.

**Keyword:** Supercapacitor; Manganese oxide; Carbon nanofibers; Polyaniline; Specific capacitance; Coin cell