

## **Effect of electropolymerization potential on the preparation of PEDOT/graphene oxide hybrid material for supercapacitor application**

### **ABSTRACT**

Conducting polymer poly(3,4-ethylenedioxythiophene) (PEDOT) hybrid with carbon-based material, graphene oxide (GO), was prepared for supercapacitor application. Different applied potentials were employed in order to study the effect of electropolymerization potential on PEDOT/GO thin film. Field emission scanning electron microscopy (FESEM) images showed that PEDOT/GO possessed more pronounced wrinkle paper-like sheet surface morphology as the potential increased from 1.0 to 2.0 V. Fourier transform infrared spectroscopy (FTIR) and Raman spectroscopy revealed that GO was successfully incorporated into PEDOT during electropolymerization. The cyclic voltammetry (CV) and galvanostatic charge-discharge (GCD) measurements revealed that the PEDOT/GO composite electropolymerized at the applied potential of 1.2 V exhibited a maximum specific capacitance of 115.15 F/g with energy density and power density of 13.60 Wh/kg and 139.09 W/kg, respectively at current density 0.3 A/g. The EIS result showed that the Rct decreased as the electropolymerization potential rose from 1 V to 1.2 V and increased when the electropolymerization further increased to 2 V due to a large electron transfer resistance that makes the rate of charge transfer becomes slower.

**Keyword:** Poly(3,4-ethylenedioxythiophene); Supercapacitor; Graphene oxide