

## **Facile synthesis of PEDOT-rGO/HKUST-1 for high performance symmetrical supercapacitor device**

### **ABSTRACT**

A novel poly(3,4-ethylenedioxythiophene)-reduced graphene oxide/copper-based metal-organic framework (PrGO/HKUST-1) has been successfully fabricated by incorporating electrochemically synthesized poly(3,4-ethylenedioxythiophene)-reduced graphene oxide (PrGO) and hydrothermally synthesized copper-based metal-organic framework (HKUST-1). The field emission scanning microscopy (FESEM) and elemental mapping analysis revealed an even distribution of poly(3,4-ethylenedioxythiophene) (PEDOT), reduced graphene oxide (rGO) and HKUST-1. The crystalline structure and vibration modes of PrGO/HKUST-1 were validated utilizing X-ray diffraction (XRD) as well as Raman spectroscopy, respectively. A remarkable specific capacitance (360.5 F/g) was obtained for PrGO/HKUST-1 compared to HKUST-1 (103.1 F/g), PrGO (98.5 F/g) and PEDOT (50.8 F/g) using KCl/PVA as a gel electrolyte. Moreover, PrGO/HKUST-1 composite with the longest charge/discharge time displayed excellent specific energy (21.0 Wh/kg), specific power (479.7 W/kg) and an outstanding cycle life (95.5%) over 4000 cycles. Thus, the PrGO/HKUST-1 can be recognized as a promising energy storage material.