# Electrochemical performance of supercapacitor with stacked copper foils coated with graphene nanoplatelets

ABSTRACT

The energy density of conventional supercapacitors is in the range of 6–10 Wh $kg^{-1}$, which has restricted them from many applications that require devices with long durations. Herein, we report a method for enhancing the energy density of a device through the parallel stacking of five copper foils coated on each side with graphene nanoplatelets. Microporous papers immersed in 2 M aqueous sodium sulphate were used as separators. With a low contact resistance of 0.05 Ω, the supercapacitor yielded an optimum specific energy density and a specific power density of 24.64 Wh $kg^{-1}$ and 402 W $kg^{-1}$ at 0.8 V, respectively. The working potential was increased to 2.4 V when three of the supercapacitors were connected in series, forming a tandem device. Its potential for real applications was manifested by the ability to light up a light-emitting diode for 40 s after charging for 60 s.

**Keywords:** Electrochemical performance; Supercapacitor; Copper foils; Graphene nanoplatelets