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Phenothiazine-functionalized rGO for Electrochemical Capacitor

S.P. Lee*[1,2], *N.H.M. Saufi*[1], *E.Y.L. Teo*[3], *and* *K.F. Chong*[1,2]

[1]Faculty of Industrial Sciences and Technology, Universiti Malaysia Pahang, 26300 Pahang, Malaysia.

[2]Center for Advanced Intelligent Materials, Universiti Malaysia Pahang, 26600 Pahang, Malaysia.

[3]Department of Science and Technology, Universiti Putra Malaysia, 97008 Sarawak, Malaysia

**Corresponding author:* ckfeng@ump.edu.my

Abstract

The functionalization arose as a technique to improve the physicochemical properties of the reduced graphene oxide (rGO) and consequently enhance the supercapacitor performance. The functionalization compound, phenothiazine (PTZ) introduces nitrogen and sulfur heteroatoms into rGO *via* the one-pot hydrothermal method. Incorporation of PTZ on the rGO sheets in PTZ-rGO 5 contributes to the high surface area (163.49 m2 g−1) and pore volume (0.3187 cm3 g−1) properties. Contradictory, overloaded PTZ not only shows a lower reduction effect but also reduces the amount of PTZ functionalized in the PTZ-rGO and consequently shows lower electrochemical performance. The excellent properties enable PTZ-rGO 5 enable it to achieve 119.5 F g−1 at 0.5 A g−1 for its specific capacitance and drive it to be the promising electrode material for supercapacitors.

Keywords: Freeze-drying; Surface modification; EDLC; Pseudocapacitive; Redox activity.