# 1-Pyrenebutyric Acid Functionalized Reduced Graphene Oxide (1-Pb-Rgo) Energy Storage

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**ABSTRACT**

Supercapacitors are a class of energy storage device which has high energy density and high power density. As a material with unique 2D structure as well as outstanding physical properties such as high electrical conductivity and large surface area, graphene demonstrates great potential to be the electrode material for supercapacitors. Despite graphene showing theoretical surface area as high as 2630 $m^2/g$, results acquired showed that not all the surface area were utilized. This could be due to the tendency of the graphene layers to restack. In this work, 1-pyrenebutyric acid (1-PB) was anchored to graphene with the pyrenyl group via π-π stacking to prevent the restacking of graphene layers. The successful functionalization of 1-PB on the hydrophobic surface of rGO was characterized with UV-Vis Spectroscopy and Fourier Transformed Infrared Spectroscopy (FTIR). The electrochemical performance of 1-PB-rGO was studied through cyclic voltammetry (CV), galvanostatic charge-discharge (CD) and electrochemical impedance spectroscopy (EIS). Using 6 M KOH as the electrolyte, we obtained an enhanced specific capacitance for 1-PB-rGO. These findings indicates that the non-covalent functionalization of 1-PB on rGO enhances the capacitive storage ability and it show potential as an electrode material in the energy storage application.

**KEYWORDS**: Reduced graphene oxide; Non-covalent functionalization; Energy storage

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