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## **RESEARCH ARTICLE**



## Functionalized seaweed-derived graphene/polyaniline nanocomposite as efficient energy storage electrode

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## Abstract

The present study demonstrates a synergistic effect of combining graphene, sourced from seaweed (*Ulva fasciata*) with polyaniline for energy storage applications via a simple aqueous synthetic route. In situ polymerization of aniline monomer resulted in unique polyaniline nanofiber-coated seaweed-derived graphene nanocomposites (PANI:SDG). Easily scalable synthetic route produced nanocomposites with improved electrical conductivity (> 75 mScm<sup>-1</sup>) and thermal stability. Results of electrochemical studies on PANI–SDG nanocomposites as electrode material showed improved specific capacitance (> 400 F g<sup>-1</sup>) with enhanced cyclic stability (1000 cycles). The unique cooperative effect between the PANI and SDG resulted in significantly improved charge storage properties in comparison to controlled PANI and graphene electrodes. The supercapacitor device prepared in this work exhibited high specific capacitance and cyclic stability and could be utilized for potential applications in a variety of devices and wearable electronics.

## **Graphical Abstract**



Keywords Seaweed biomass · Seaweed-derived graphene · PANI · Nanocomposites · Supercapacitor

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