

Innovative 2D Nanomaterials for Electronics and Energy Storage

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Innovative and high-quality nanomaterials are critical in accelerating 2D research for energy and electronics applications.

Through academic collaborations and internal R&D, we have developed graphene oxides, graphene derivatives, and 2D nanomaterials including germanane and black phosphorus. In collaboration with Northwestern University, these 2D nanomaterials were formulated into well-characterized, ready-to-use inks containing few-layered graphene, exfoliated hexagonal boron nitride, or transition metal dichalcogenides. Our cutting-edge inks enable device fabrication through scalable additive printing methods such as aerosol, inkjet, gravure, screen, and 3D printing. These materials have been used in a variety of applications including printed electronics, printed micro-supercapacitors, next generation lithium-ion batteries, and photodetectors. We will highlight a few examples using these 2D nanomaterials for high-temperature lithium-ion battery separators, electrodes, solid-state electrolytes, as well as barrier materials in printed electronic devices and bioactive 3D printable scaffolds.