Graphene fiber capacitor

What is graphene fiber/fabric based supercapacitors?

Graphene fiber/fabric is a very competitive substrate for flexible electrodeswith exceptional electrochemical and mechanical properties. Herein,the recent progress on graphene fiber/fabric-based supercapacitors is reviewed,focusing on the fabrication of graphene fiber elements,the control of fiber structure,and the preparation of fabrics.

What are three-ply core-sheath graphene fiber supercapacitors?

Three-ply core-sheath graphene fiber supercapacitors with thin and continuous wrinkling gel electrolyte interlayer,which are fabricated by a facile and direct spinning through an elaborately designed spinneret with a coaxial three-channel structure,show high specific capacitance,cycling stability and energy density. 1. Introduction

What is the phase angle of a graphene nanosheet capacitor?

At 120 Hz,the impedance phase angle of the graphene nanosheet capacitor was approximately -82°as compared with ~0° for the activated carbon capacitor and approximately -83° for the aluminum electrolytic capacitor. The phase angle for a blank (bare Ni electrode prototype) was -85°.

Why is CNT a good conductor of graphene?

The uniform distributionof CNT within the fiber prevents the stacking of graphene sheets,allowing the composite fiber to exhibit a SSA of 396 m 2 /g and a conductivity of 10,200 S/m. The large SSA and conductivity results in a large electrochemical active area (ion-accessible surface) and a capacitance of up to 305 F/cm 3.

What is the capacitance of a graphene-Pani composite?

The hybrid type film presents a gravimetric capacitance of 233 F g -1and a volumetric capacitance of 135 F cm -3. Similarly,Wei et al. synthesized a graphene-PANI composite by a polymerization method,where graphene (~15 wt %) was homogeneously coated on to PANI sheets .

How strong are graphene fibers?

The results of small-angle X-ray scattering demonstrated that graphene fibers had an OD of 81% and ultrahigh strength of 1.45 GPa. Alternatively,it appears that the structure of spinning microchannels will similarly affect the OD of graphene fibers.

The carbon fiber electrodes for the SSCs were coated with graphene nanoplatelets (GNPs) at varying weight ratios (3, 6, 10, and 15 wt %), utilizing their ultrahigh surface area and exceptional mechanical properties to enhance both electrochemical and mechanical performance. Experimental results indicated that a significant increase of up to ...

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This review summarizes recent development on graphene-based materials for supercapacitor electrodes, based on their macrostructural complexity, i.e., zero-dimensional (0D) (e.g. free-standing graphene dots and particles), one-dimensional (1D) (e.g. fiber-type and yarn-type structures), two-dimensional (2D) (e.g. graphenes and graphene-based ...

We have demonstrated efficient filtering of 120-hertz current with DLCs with electrodes made from vertically oriented graphene nanosheets ...

We present an all-fiber graphene electroabsorption optical modulator built onto a side-polished ...

We first discuss the assembly of GFs via hydrothermal methods to translate the properties of graphene into GFs and achieve scalable GF production, including mechanistic studies and process parameter optimization. We also discuss the critical roles of wet GFs" drying conditions in determining GFs" porous structures and ...

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Supercapacitors, with the merits of both capacitors for safe and fast charge and batteries for high energy storage have drawn tremendous attention. Recently, laser scribed graphene has been increasingly studied for ...

Attributed to their soft and stretchable feature, flexible supercapacitors have attracted increasing attention in areas of soft electronics, wearable devices, and energy storage systems. However, it is a challenge to ...

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We have explored a new method to produce flexible and all-solid-state graphene fiber supercapacitors (GFSs) from wet-spun graphene fibers. The GFSs exhibited high capacitance (3.3 mF cm-2) and ...

Here, we present an electric-field-assisted cold-wall plasma-enhanced chemical vapor (EFCW-PECVD) method for direct growth of vertical graphene (VG) on fiber electrodes, which is incorpo-rated...

We present an all-fiber graphene electroabsorption optical modulator built onto a side-polished optical fiber in a coplanar capacitor configuration. For a maximum PMMA superstrate thickness of 1 um and for a gap of 0.1 and 1 um it was possible to obtain, respectively, a maximum modulation depth of 7.6 dB/mm and 5.3 dB/mm, a capacitance of 98. ...

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oriented graphene nanosheets grown directly on metal current collectors.

Strategies to improve the overall performance of graphene fiber based ...

Herein, we developed a scalable method to produce hierarchical porous carbon nanofibers/graphene hybrid fibers (CNGFs) for flexible supercapacitor electrodes with high specific capacitance and durable cycle ...

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