Advanced Carbon Fiber Electrodes

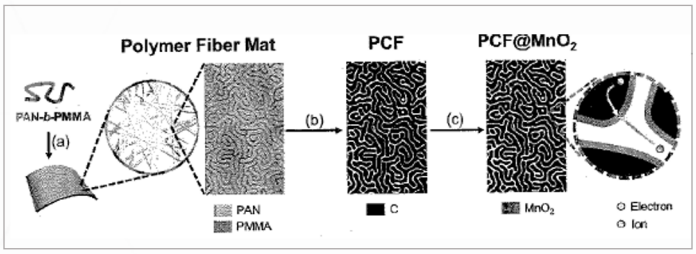
VTIP 19-016: "Manganese Dioxide Coated Block Copolymer-derived Porous Carbon Fiber Composites with Uniform Mesopores, High Mass Loading and Ultrafast Electron and Ion Transport"

THE CHALLENGE

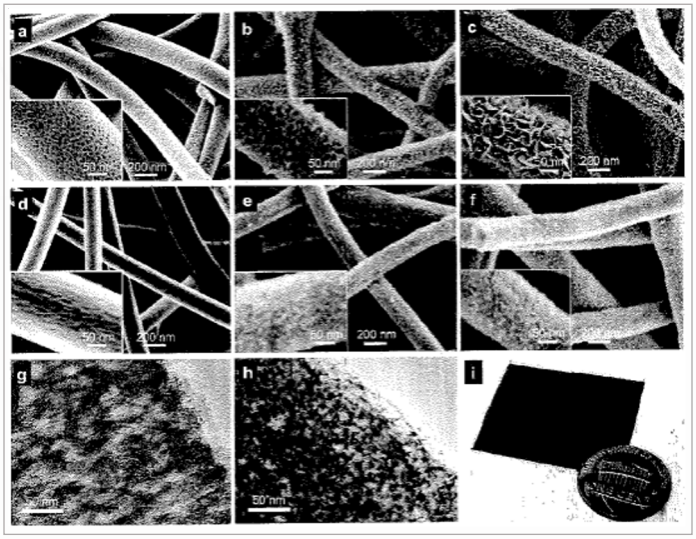
For decades we have used energy storage technologies to power the products we use every day. Today's electronics are impressive but have well known limitations. High mass loading and fast charge support are two crucial but often mutually exclusive characteristics of modern electrodes. Advancement in carbon fiber composites are needed to improve electrode performance and could be implemented to drastically improve our electrochemical devices. Achieving this could revolutionize energy storage and lead to never-before-seen technologies.

OUR SOLUTION

Virginia Tech's Guoliang Liu and his team have developed a new platform of carbon fiber support that can be used as electrodes in electrochemical devices including batteries, supercapacitors, and fuel cells. The carbon support can also be used as fillers in thermoplastics, elastomers, and other polymers. The invention is an excellent support for catalysis, filtration, and separation as well. The team has proven that their composite can outperform other similar materials with its impressive mesopore uniformity. The technology has potential to make a lasting impact on the renewable energy industry and others.



Schematic illustration of the synthesis of PCF and PCF@MnO2.



Pictured are morphology characterizations.

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