Photothermal capacitor

Can photothermal supercapacitors be used in optical/temperature sensing devices?
Additionally,the packaging of the photothermal supercapacitor in a transparent PET membrane preserved its enhanced photothermal capacitance performance. This work provides an innovative strategy to obtain flexible supercapacitors for practical applications and alsoinitiates a new concept for optical/temperature sensing devices.

Can photothermal Supercapacitors deliver electrochemical energy over a wide range of temperatures?
To deliver electrochemical energy over a wide range of temperatures, this work studies a new gel polymer electrolyte (GPE) for photothermal supercapacitors operating from -60 to 65 °C.

Why do supercapacitors have a photothermal effect?
Here, under solar illumination, the capacitance, energy density and power density of supercapacitors are all largely enhanced owing to the photothermal effect.

Can photothermal materials be used in supercapacitors?
Inspired by this, photothermal materials with a high photothermal conversion efficiency can be introduced as photothermal coating or films when constructing supercapacitors for the low-temperature but solar-energy sufficient scenarios , , .

How does solar illumination affect the capacitance of A pseudocapacitor?
Under 1 solar illumination,the capacitance of the pseudocapacitor increases by ~1.5 times,and the capacitance of the electric double-layer capacitor increases by ~3.7 times. The mechanism is quantitatively analyzed and discussed.

Can a photothermal-assisted supercapacitor work at 40 °C?
In summary,we have successfully fabricated a novel photothermal-assisted supercapacitor capable of working at -40 °Cbased on bifunctional TiN-based electrodes. The photothermal-stimulated self-heating effects boost the device with much enhanced low-temperature performance.

As an enabling technology, the state-of-the-art for wound film capacitors is continuously being driven towards higher temperature, higher energy density, and longer life to support the development of tomorrow"s advanced systems. Progress in high temperature capacitors, defined in this work as a capacitor operating at temperatures at or above 100°C, is particularly ...

capacitor (catastrophic failures) are more challenging, which calls for an instantaneous thermal modelling for monitoring and thus protection of the DC-link capacitors. Hence, as an extended study of [18], this paper serves to explore the instantaneous modelling approaches for the DC-link capacitor in grid-connected single-phase PV sys- tems. Firstly, the traditional thermal model of ...

Photothermal capacitor

3D-printed NiCoP/MXene//AC asymmetrical supercapacitor full cells harvest a record-high areal/volumetric energy density and allow the fine construction of electrodes with ...

Photo-thermal conversion (PTC) technology is one of the primary avenues for capturing and harnessing solar energy, wherein the indispensable PTC materials can ...

Additionally, the packaging of the photothermal supercapacitor in a transparent PET membrane preserved its enhanced photothermal capacitance performance. This work ...

Flash-enabled graphene (FG) absorbers are produced through a simple and facile flash reduction process, which can be coated on the surface of any SC devices to lift their working temperature via a photothermal effect, ...

Here we report the advancement in photothermal-assisted supercapacitors operable at -40 °C using an electrochemically active and photothermal electrode material of commercially available TiN ...

Although considerable photothermal-induced enhancement in SC performances has been achieved recently, designing dual-functional SC electrodes with photothermal capability is not ideal for achieving optimized photothermal enhancement effects in practical SC devices for four main reasons. First, these interior photothermal-enhanced SCs require the electrode ...

Photothermal conversion phase change materials can combine the mechanisms of photothermal conversion and phase transformation to realize storage or release solar energy at constant temperature by ...

To deliver electrochemical energy over a wide range of temperatures, this work studies a new gel polymer electrolyte (GPE) for photothermal supercapacitors operating from -60 to 65 °C. The GPE consists ...

Under 1 solar illumination, the capacitance of the pseudocapacitor increases by ~1.5 times, and the capacitance of the electric double-layer capacitor increases by ~3.7 times. The mechanism is quantitatively analyzed and discussed. This work provides new insights into the applications of solar energy and offers new design options ...

However, the performance of supercapacitors at low temperatures is anticipated to significantly improve by employing electrode materials with photothermal performance, thereby achieving rapid temperature rise of the device through solar photothermal effect. Liu Z et al. employed a 3D multistage structure graphene electrode and proposed utilizing its ...

Here we report the advancement in photothermal-assisted supercapacitors operable at -40 °C using an electrochemically active and photothermal electrode material of ...

Photothermal capacitor

Photo-thermal conversion (PTC) technology is one of the primary avenues for capturing and harnessing solar energy, wherein the indispensable PTC materials can effectively capture solar radiation and convert it into thermal energy, thereby presenting promising prospects in various applications, such as hot water and hot air generations, desalinat...

The performance of supercapacitor degenerates at low temperature, even fails to work sometimes. Solar photothermal conversion provides a new direction for the performance improvement of supercapacitor. Manganese dioxide (MnO₂) has a high specific capacity, while it should be compounded with other active materials due to its low electric ...

To deliver electrochemical energy over a wide range of temperatures, this work studies a new gel polymer electrolyte (GPE) for photothermal supercapacitors operating from -60 to 65 °C. The GPE consists of polyacrylonitrile mixed with an active filler sodium polystyrenesulfonate that simultaneously improves ionic conductivity and ...

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