

Thin Film Supercapacitor

Can thin film supercapacitor devices provide high performance in energy delivery?

In summary, we demonstrated the design of transparent, flexible thin film supercapacitor devices with high performance in energy delivery. The devices were assembled using complex nano-engineered thin graphitic film electrodes with significantly increased surface area and three-dimensional structure.

How are thin film solid state supercapacitors made?

Here we construct mechanically flexible and optically transparent thin film solid state supercapacitors by assembling nano-engineered carbon electrodes, prepared in porous templates, with morphology of interconnected arrays of complex shapes and porosity.

Can TiN thin films be used as a supercapacitor?

Significantly, we have successfully demonstrated a symmetric supercapacitor device using two identical TiN thin films that reaches an impressive energy density of 17.6 mWh cm^{-3} at a power density of 1.1 W cm^{-3} . TiN thin films were produced on single polished silicon (100) wafers using a reactive magnetron sputtering system for 30 min.

What is symmetric supercapacitor based on TiN thin films?

Furthermore, a symmetric supercapacitor device based on TiN thin films is successfully produced and achieves a maximum energy density of 17.6 mWh cm^{-3} at a power density of 1.1 W cm^{-3} , along with outstanding cycling stability.

What is a solid-state thin-film asymmetric supercapacitor?

Here, a solid-state thin-film asymmetric supercapacitor (ASC) based on highly conductive TMO was fabricated by regulating the microstructure of electrode materials.

Can TiN thin films be used as supercapacitor electrodes?

Achour et al. demonstrated the TiN thin film electrodes sputtered with a highest specific capacitance of 8.8 mF cm^{-2} at a scan rate of 100 mV s^{-1} . Currently, a major challenge of using TiN thin films as supercapacitor electrodes is to further improve their specific capacitance.

Thin film supercapacitors were fabricated using printable materials to make flexible devices on plastic. The active electrodes were made from sprayed networks of single-walled carbon nanotubes (SWCNTs) serving ...

Here, a solid-state thin-film asymmetric supercapacitor (ASC) based on highly conductive TMO was fabricated by regulating the microstructure of electrode materials.

CNC films are transparent with transmittance of 71% at 550 nm wavelength (supplemental Fig. S1) and so the fabricated solid state thin film CNC supercapacitor devices are optically transparent and ...

Thin Film Supercapacitor

Vacuum-assisted (physical) growth yields high purity, precise dimensions with a line-of-sight deposition, along with high adhesion between the film and the substrates, and hence, these techniques are necessary to ...

With the rapid development of portable electronics, all-solid-state thin-film supercapacitors (ASSTFSs) have attracted tremendous attention and been considered as competitive candidates owing to their ultraflexibility and high safety. The major challenge in ASSTFSs is the low capacity and energy density due Flexible energy storage and conversion

Herein we demonstrate the production of 3D electrodes with ultra-high capacitance values. Our approach consists in combining an efficient and robust 3D scaffold with RuO₂ pseudocapacitive thin films allowing maximizing the areal capacitance without any degradation of the rate performance. We show that it is possible to reach a remarkable areal ...

In the present study, the synthesis of a thin film of copper oxide on a flexible copper substrate through electrodeposition was carried out to produce a flexible and lightweight supercapacitor. The supercapacitor's performance was evaluated using cyclic voltammetry (CV) and galvanostatic charge-discharge analysis in a 1 M KOH electrolyte. The results showed ...

In summary, we demonstrate the growth of TiN thin films on the silicon wafers using magnetron sputtering method under different nitrogen gas flow rates and investigate their electrochemical performance as supercapacitor electrodes. TiN thin film electrodes show long-term cycling performance with an optimized specific capacitance of ...

These all-carbon thin films are combined with plastic paper and gelled electrolyte to produce solid-state bendable thin film supercapacitors. We assembled ...

In 2000, Lim et al. [120] developed the first solid-state thin-film supercapacitors utilizing DC reactive sputtering with an amorphous and smooth dense ruthenium oxide (RuO₂) ...

Nanoflakes manganese oxide (MnO₂) electrodes were deposited by galvanostatic electrodeposition method. The prepared MnO₂ thin film was characterised by using various characterization techniques such as X-ray diffraction (XRD), scanning electron microscopy (SEM). The testing of MnO₂ electrode as a supercapacitor is made with the help ...

The supercapacitor device with NiO thin film as the working electrode, carbon thin film as the counter electrode (reference electrode being short), and 6 M KOH as an electrolyte, displays 113.73 F ...

Here we construct mechanically flexible and optically transparent thin film solid state supercapacitors by assembling nano-engineered carbon electrodes, prepared in porous templates, with...

Thin Film Supercapacitor

Vacuum-assisted (physical) growth yields high purity, precise dimensions with a line-of-sight deposition, along with high adhesion between the film and the substrates, and hence, these techniques are necessary to manufacture many macro- to ...

In 2000, Lim et al. [120] developed the first solid-state thin-film supercapacitors utilizing DC reactive sputtering with an amorphous and smooth dense ruthenium oxide (RuO_2) thin-film electrode and an amorphous $\text{Li}_x\text{PO}_y\text{N}_z$ (Lipon) thin-film electrolyte (RuO_2 /Lipon/ RuO_2 /Pt) as depicted in Figure 31.

An amorphous and hydrous vanadium oxide ($\text{V}_2\text{O}_5 \cdot x\text{H}_2\text{O}$) thin film of approximate 6-nm thickness was electrochemically prepared onto a carbon nanotube (CNT) film substrate with a three-dimensional porous structure on a nanometer scale for supercapacitor application [136].

Web: <https://doubletime.es>

