Titanium nitride energy storage material

What is titanium nitride?

Among these, titanium nitride (TiN), possesses high electrochemical stability, outstanding electrical conductivity, and a unique electronic structure. Nanocomposites based on titanium nitrides are known to deliver higher electrochemical performance than pristine nanostructured TiNs due to potential synergetic effects from both the materials.

Are transition metal nitrides suitable for electrochemical energy storage and water splitting?

Among them,transition metal nitrides (TMNs) are suitable for a myriad of devices because they have better electrical conductivity than oxides and excellent catalytic properties. Although there are several reviewsabout TMNs for electrochemical energy storage or water splitting,a review of recent advances of 2D TMNs materials is still scarce.

Can transition metal nitride nanocomposites be used for energy storage?

This review describes some recent developments of our group in research of transition metal nitride nanocomposites in application of energy storage, especially for lithium ion battery and supercapacitor.

Why is titanium nitride an attractive electrode material?

Titanium nitride (TiN) is an attractive electrode material because of the high electrical conductivityof 5.5 × 10 4 S cm -1 that fulfills the requirements for high-rate performance .

Why are transition metal nitrides emerging as novel electrode materials?

Transition metal nitrides (TMNs) are emerging as novel electrode materials because of their unique electronic structure, high conductivity, superior chemical stability, as well as good electrocatalytic activity , . In addition, TMNs possess interesting mechanical properties such as high hardness, contradictory ductile vs. brittle behavior.

What is MnO2 titanium nitride nanotube coaxial array?

One dimensional MnO2/titanium nitride nanotube coaxial arrays have been designed for a high performance electrochemical capacitive energy storage system based on the concept of fabricating an efficient, fast charge separation network. This nanostructured composite material was prepared by electrodepositing m

Nowadays, two-dimensional (2D) transition metal carbides, carbonitrides and nitrides called MXenes show great prospect as potential electrode materials for energy storage devices with high volumetric energy and power densities [10], [11]. They are generally synthesized through the selective etching of the reactive A layers from the precursor MAX ...

Nowadays, researchers are more focused on developing high-performance electrodes for electrochemical energy storage and conversion devices. Transition Metal ...

These findings suggest that sulfur doping in transition metal nitrides holds promise as a viable strategy for developing high-performance materials for electrochemical ...

In this paper, cheap raw material pentaerythritol (PE) is selected as the energy storage medium. Titanium nitride (TiN) with localized surface plasmon resonance is used as light absorber and ...

Tang, S. et al. Preparation of Titanium nitride nanomaterials for electrode and application in energy storage. Results Phys. 7, 1198-1201 (2017). Article ADS Google Scholar

Titanium nitride (TiN) is one of the most well-established engineering materials nowadays. TiN can overcome most of the drawbacks of palsmonic metals due to its high ...

For example, vanadium nitride is promising for energy storage due to its high theoretical capac-itance value and good conductivity. Therefore, its incorporation with TiN can further boost the ...

In recent years, energy storage materials and devices have gained considerable attention because of rapidly increasing energy consumption rates. ... Effect of oxidative surface treatments on charge storage at titanium nitride surfaces for supercapacitor applications. J. Mater. Chem. A Mater., 5 (2017), pp. 4550-4559, 10.1039/C6TA08308K.

DOI: 10.1021/am100951h Corpus ID: 206767424; Facile preparation of mesoporous titanium nitride microspheres for electrochemical energy storage. @article{Dong2011FacilePO, title={Facile preparation of mesoporous titanium nitride microspheres for electrochemical energy storage.}, author={Shanmu Dong and Xiao Chen and Lin Gu and Xin-hong Zhou and Hongxia ...

Carbon@ titanium nitride dual shell nanospheres as multi-functional hosts for lithium sulfur batteries Y Wang, R Zhang, Y Pang, X Chen, J Lang, J Xu, C Xiao, H Li, K Xi, ... Energy Storage Materials 16, 228-235, 2019

One dimensional MnO 2 /titanium nitride nanotube coaxial arrays have been designed for a high performance electrochemical capacitive energy storage system based on the concept of fabricating an efficient, fast charge separation network. This nanostructured composite material was prepared by electrodepositing mesoporous MnO 2 into TiN nanotube arrays (TiN NTA), ...

MXenes, recognized for their potential in energy storage and conversion, face significant challenges due to severe degradation in oxidative environments, which compromises their functional properties and limits further ...

The exploitation of intermitted renewable energy sources calls for the development of energy storage technologies, including mainly supercapacitors (SCs) and batteries, to achieve high energy density, large power output, and long service life with a high level of great safety [[1], [2], [3]].While batteries can have high

energy density, they suffer from ...

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