

The direct formation of C N and C O bonds from inert gases is essential for chemical/biological processes and energy storage systems. However, its application to carbon nanomaterials for improved energy storage remains technologically challenging. A simple and very fast method to form C N and C O bonds in reduced graphene oxide (RGO) and carbon ...

To further improve the performance of thermal energy storage (TES) system with phase change materials (PCMs), this paper proposed a novel method, i.e. combining the additions of TiO₂ nanoparticles ...

The safety and efficient utilization of lithium-ion batteries are becoming increasingly important with the rapid development of new energy vehicles and energy storage systems around the world [1]. However, irreversible electrochemical reactions during the charging and discharging of lithium-ion batteries cause increased battery internal resistance and the ...

The laser-sculptured polycrystalline carbides (macroporous, ~10-20 nm wall thickness, ~10 nm crystallinity) show high energy storage capability, hierarchical porous ...

Moreover, monitoring the changes of hundreds of cells in energy storage systems using ultrasonic sensors presents several engineering challenges. These challenges include ...

Then, the effectiveness of ultrasonic energy on enhancing heat storage process was discussed. The present work was also compared with other representative studies. The results show that when the side surface of the container is a constant temperature heating surface, the ultrasonic vibration surface at the bottom of the container has best ...

With regard to energy storage capacity, the evolution trend can be described as 14,285.34 J, 14409.42 J, 14928.86 J, 14570.88 J, and 14,389.92 J, respectively. From the quantitative perspective, the effect of ultrasonic mechanism on energy storage is similarly related to the ultrasonic strategies.

In article number 1702747, Jong-Beom Baek, Tae-Hyuk Kwon, and co-workers report direct C-N and C-O bond formation in various carbon nanomaterials with N₂ or O₂ gas by a simple ultrasonic spray chemical reaction. The resulting N-doped carbon nanomaterials display remarkable performance for energy-storage applications. Furthermore, the double ...

without ultrasonic aid and red line: with ultrasonic aid at 137.56 W, 120 kHz). Fig. 7. Effect of reaction time on XRD patterns of the samples (a: 45 °, 800 rpm; b: 45 °, 120 kHz ...

Estimating the state of charge (SOC) for lithium-ion batteries is one of the crucial issues for energy storage

devices. To improve the accuracy and efficiency of the predictions, on the one hand, the researchers continuously develop more advanced algorithms based on the signals of temperature, voltage and current; on the other hand, new types of sensors are also ...

The resulting N-doped carbon nanomaterials display remarkable performance for energy-storage applications. Furthermore, the double-nozzle system used for the ultrasonic ...

Regarding the CV of the sample in absence of ultrasound, no well-defined trails for typical behaviors of the energy storage materials were observed, and the specific capacitance of the 8 h un-sonicated sample (Fig. 5 (a)) at 10 mV/s was calculated to be only 3.4F/g, while the corresponding specific capacitance for the sonicated sample (Fig. 5 ...

Abstract. The synthesis of Ti_3C_2Tx MXene is hampered by the low extraction efficiency of aluminum from Ti_3AlC_2 . Although ultrasound has been preliminarily proved to be well suited for boosting the synthesis efficiency of Ti_3C_2Tx MXene, insightful study on the effect of ultrasound on synthesis and energy storage mechanism of Ti_3C_2Tx MXene is scarce.

The maximum instantaneous energy of the ultrasonic signal is extracted with the ultrasonic energy entropy and the ultrasonic reception entropy as the characteristic quantity to measure the charge state of the ... Lithium-ion batteries have become one of the most critical energy storage systems due to their long cycle life and high energy ...

This paper reports the advanced Ta_2O_5 nanomaterial, prepared by ultrasonication via DMSO (Dimethyl sulfoxide) as a solvent; towards the rechargeable Li-ion battery photocatalytic dye degradation and electrochemical nitrite sensing applications. Elemental and structural confirmation of Ta_2O_5 nanoparticles (NPs) has been characterized by XRD and ...

Researchers devise a method to store iontronic energy in a polymer film based on osmotic effects, achieving high energy and power density. Making salinity gradient energy practical is a great...

In the present work, we demonstrated a highly efficient approach for the chemical etching of Ti_3AlC_2 to prepare Ti_3C_2Tx MXene with superior energy storage performance. ...

Thermal energy storage using PCMs can contribute greatly in the development of new thermal systems to increase energy efficiency and also decrease CO₂ emissions [5]. In general, phase change can be divided into several forms: solid-solid, solid-liquid, solid-gas, liquid-gas and vice versa. ... Ultrasound is sonic wave of frequency of 2 ...

To further improve the performance of thermal energy storage (TES) system with phase change materials (PCMs), this paper proposed a novel method, i.e. combining the ...



Ultrasonic energy storage

1. Introduction. Lithium-ion batteries (LIBs) are already ubiquitous in electric vehicles, consumer electronics, and energy storage devices [1], and their usages are expected to be boosted even further by the upcoming governmental bans on fossil-fuel vehicle sales in many countries [2], [3].Manufacturers are thus incentivised to ramp up production and push ...

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