

Multi-functional polymer gel materials based on thermal phase change materials (PCMs) are rapidly advancing the application of thermal energy storage (TES) in energy-saving buildings. In this work, we report multi-functional PCM composites with anti-liquid leakage, shape memory, switchable optical transparency, and thermal energy storage. Due to the excellent ...

In this article, we summarize the recent progress of carbon materials derived from heavy oil by-products and their utilization as electrode materials for energy storage devices. At first, we ...

Compressed air energy storage (CAES) is one of the most promising energy storage technologies, which mainly utilizes surplus electric energy to compress and seal the normal air into underground cavern (e.g., abandoned mines or wells, excavated caverns) for a low load period of the power grid, and releases the high-pressure air to drive the steam turbine for ...

Although great improvements have been observed in research and development of wireless sensor network technology, efficient and reliable energy storage and generic plug and play ...

There are, in fact, several devices that are able to convert chemical energy into electrical energy and store that energy, making it available when required. Capacitors are energy storage devices; they store electrical energy and deliver high specific power, being charged, and discharged in shorter time than batteries, yet with lower specific ...

Phase change materials (PCMs) offer a promising solution to address the challenges posed by intermittency and fluctuations in solar thermal utilization. However, for organic solid-liquid PCMs, issues such as leakage, low thermal conductivity, lack of efficient solar-thermal media, and flammability have constrained their broad applications. Herein, we ...

On the other hand, different design approaches of the energy storage devices have been developed, such as layered, planar, and cable designs (Sumboja et al. 2018). In fact, most of the electrochemical energy storage devices have met the criteria of being wearable, functionable, and, to some extent, compatible.

Underground water-sealed oil storage has proven to be a cost-effective approach for maintaining strategic petroleum reserves worldwide because of its improved safety, geographical adaptability ...

Recently, the three-dimensional (3D) printing of solid-state electrochemical energy storage (EES) devices has attracted extensive interests. By enabling the fabrication of well-designed EES device architectures, enhanced electrochemical performances with fewer safety risks can be achieved. In this review article, we summarize the 3D-printed solid-state ...

Flexible energy storage devices have received much attention owing to their promising applications in rising wearable electronics. By virtue of their high designability, light weight, low cost, high stability, and mechanical flexibility, polymer materials have been widely used for realizing high electrochemical performance and excellent flexibility of energy storage ...

CO<sub>2</sub> geological utilization and storage (CGUS) is an important technology to achieve a deep cut of global CO<sub>2</sub> emissions. CO<sub>2</sub> leakage from the subsurface may impair the performance of CGUS projects, and the CO<sub>2</sub> leakage through wellbores is the most common leakage pathway. This paper proposes a workflow for wellbore CO<sub>2</sub> leakage risk ...

This study investigated how subsurface and atmospheric leakage from geologic CO<sub>2</sub> storage reservoirs could impact the deployment of Carbon Capture and Storage (CCS) in the global energy system. The Leakage Risk Monetization Model was used to estimate the costs of leakage for representative CO<sub>2</sub> injection scenarios, and these costs were incorporated into the ...

For hydraulic fracture energy storage, reducing leakage energy loss is crucial to improve the efficiency. As can be inferred from Eq. (3.1), leakage energy loss is affected by the geomechanical parameters of the geological formation hosting the reservoir and the mechanical properties of the rock. Of these parameters permeability and fracture ...

Therefore, renewable energy installations need to be paired with energy storage devices to facilitate the storage and release of energy during off and on-peak periods [6]. Over the years, different types of batteries have been used for energy storage, namely lead-acid [ 7 ], alkaline [ 8 ], metal-air [ 9 ], flow [ 10 ], and lithium-ion ...

Oil pipeline leakage monitoring is an important means to ensure the safe, environmentally friendly, efficient and reliable operation of oil and gas pipelines, and an important part of promoting the energy production and consumption revolution and establishing a clean and low-carbon energy system (Liu et al., 2017).

CAES systems can utilize the low cost of electricity that is experienced during peak power generation times. These systems can convert atmospheric air into high pressure air and store the highly pressurized air in storage devices, and when there is a shortage of electricity, they can reconvert air energy into electricity through power generation systems.

Web: <https://www.arcingenieroslaspalmas.es>