

# Principle of solid-state hydrogen energy storage

High-energy-density hydrogen-storage technology is essential to bridge the gap between hydrogen production and its energy-storage applications. At the same time, hydrogen ...

Many solid hydrogen storage materials such as magnesium-based hydrides, alanates, and/or borohydrides display promising hydrogen densities far superior to the current state of ...

Highlights The pivotal role of solid-state hydrogen storage for advancing clean energy was emphasized. Progresses in mechanisms, properties, and improvement of solid-state hydrogen ...

In order to solve this limitation of hydrogen, solid-state hydrogen storage materials are used to store hydrogen efficiently and effectively. In this chapter, an attempt has ...

Specifically, we present the hydrogen storage mechanisms by solid materials, particularly metal materials, along with their kinetic and thermodynamic principles. Additionally, ...

The mass storage of hydrogen is a challenge considering large industrial applications and continuous distribution, e.g., for domestic use as a future energy carrier that ...

Non-dissociative chemisorption solid-state storage of hydrogen molecules in host materials is promising to achieve both high hydrogen capacity and uptake rate, but there ...

Solid-state technology is considered the most affordable, secure and volumetrically efficient technique to store green energy. The key role of hydrogen storage in ...

The hydrogen storage material is the core of solid-state hydrogen storage, and its performance directly determines the system's hydrogen storage capacity, kinetics, cycle life and other ...

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Solid-state hydrogen storage: Metal hydrides, Intermetallic hydrides, complex hydrides, Physisorption of hydrogen on porous materials. thermodynamics and kinetics of metal ...

Hydrogen as a promising clean energy has received more and more attention, and the key to the development and utilization of hydrogen energy is to solve the problem of hydrogen storage. ...

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Abstract The exploration of novel sources of hydrogen energy has been a prime research focus in recent past. Two-dimensional (2D) materials offering suitable physical ...

Overall, this review provides insights into the broad spectrum of hydrogen storage materials, emerging hydrides, and industrial perspectives, offering a foundation for future ...

To achieve a driving range comparable to existing automobiles, it is essential to possess solid-state storage materials with elevated gas density and volumetric hydrogen ...

Solid-state storage of hydrogen molecules in carbon-based light metal single-atom materials is promising to achieve both high hydrogen storage capacity and uptake rate, ...

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