

# Principles and applications of solid-state hydrogen energy storage

The development of novel solid-state electrolytes is crucial for advancing high-performance solid-state batteries. However, the fast-charging capability and low-temperature performance of ...

While acknowledging that the cost and performance of solid-state hydrogen storage are not yet fully competitive, the paper highlights its unique advantages of high safety, energy density, and ...

Abstract Hydrogen energy, known for its high energy density, environmental friendliness, and renewability, stands out as a promising alternative to fossil fuels. However, its broader ...

The volumetric hydrogen storage capacity of  $28 \text{ kg} \cdot \text{m}^{-3}$  achieved in our films is comparable to that of pressurized steel cylinders, highlighting their potential for practical ...

Abstract 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 ...

Hydrogen is a promising clean energy carrier, but its widespread adoption relies on the development of efficient and safe storage solutions. Solid-state materials have emerged ...

To make solid-state hydrogen storage materials more appropriate for hydrogen-powered cars and renewable energy storage, ongoing research attempts to enhance their ...

Hydrogen energy, known for its high energy density, environmental friendliness, and renewability, stands out as a promising alternative to fossil fuels. However, its broader ...

This book provides a comprehensive review of the latest hydrogen storage and transportation technologies. Starting with fundamental principles and research frontiers, the book introduces ...

Learn how solid state hydrogen storage materials are transforming hydrogen energy by making it safer, compact, and eco-friendly -- a smart solution for a clean energy ...

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 ...

An economy based on hydrogen is widely regarded as the potential successor of the fossil-fuel-driven present energy sector. One major obstacle in developing the hydrogen ...

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Solid-state hydrogen storage, with its high storage density and safety, involves storing hydrogen within or on the surface of materials through physical adsorption, chemical ...

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 advancements in solid-state hydrogen storage are pivotal for the transition to a hydrogen economy, offering solutions that could transform energy storage, transportation, ...

Abstract The implementation of hydrogen energy as a renewable and ecologically friendly energy carrier has generated significant interest, however, efficient storage ...

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