

This article offers a comprehensive overview of recent theoretical advancements in hydrogen storage, outlining a general framework for achieving practical hydrogen uptake.

However, the development of efficient and economically viable solid-state storage materials is still a challenge, and research continues in this field. Borophene is a two ...

The material storage of hydrogen involves the use of materials that can absorb and release hydrogen reversibly, often through processes such as absorption or adsorption. This method is being explored as an alternative to traditional ...

This review will discuss recent advances and challenges in hydrogen storage via adsorption on various surfaces, including the principles of hydrogen adsorption, various ...

These findings demonstrate that the hydrogen densities in porous materials under cryogenic conditions are 10 times higher than those in the gaseous phase. These insights are critical for ...

Characterization tools for accurate H₂ storage measurements Development and testing of new materials with high storage density and appropriate enthalpy of H₂ adsorption. Our ...

6 ...; Adsorption-based hydrogen storage continues to be of substantial interest as a potentially safe and low-cost solution for storage and transport. This review highlights the ...

The paper adopts an interdisciplinary approach to comprehensively review the current knowledge in the field of porous geological materials for hydrogen adsorption. It focuses on detailed analyses of the ...

Compared to absorption, adsorption of hydrogen on carbon materials is observed to be more favorable in terms of storage capacity. Taking in to account of these facts, in this short review, an overview on hydrogen ...

As a potential solution, adsorption-based hydrogen storage using porous materials has shown great promise due to fast kinetics and their ability to store a comparable amount of hydrogen at ...

Hydrogen is a promising energy carrier, and its demand for various applications is rising, projected to reach nearly USD 309.17 billion by 2030. Unfortunately, finding efficient and ...

As a kind of clean energy, hydrogen energy has great potential to reduce environmental pollution and provide efficient energy conversion, and the key to its efficient utilization is to develop safe, economical and portable

...

This review provides a brief summary, with pros and cons, of the following practical hydrogen storage techniques: high-pressure gas storage, hydrogen liquefaction, chemical absorption, and physical adsorption. We ...

Hydrogen is a key energy carrier, playing a vital role in sustainable energy systems. This review provides a comparative analysis of physical, chemical, and innovative hydrogen storage methods from technical, ...

Metal Hydride Storage Materials The Hydrogen and Fuel Cell Technologies Office's (HFTO's) metal hydride storage materials research focuses on improving the volumetric and gravimetric capacities, hydrogen adsorption/desorption ...

It also provides an outlook on material design, process engineering, and commercialization of porous materials for hydrogen storage. We hope this review will inspire research toward developing next-generation hydrogen storage ...

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