

Can rare-earth metals revolutionize hydrogen storage?

By elucidating the fundamental principles, synthesis methods, characterization techniques, and performance enhancement strategies, we unveil the immense potential of rare-earth metals in revolutionizing hydrogen storage.

What is a rare earth-based hydrogen storage alloy?

A rare earth-based hydrogen storage alloy was prepared by a novel vacuum suction casting method (SC alloy). The La 0.6 Mg 0.3 Ni 3.45 Nd 0.1 SC alloy has remarkable hydrogen absorption performance with the maximum of 1.63 wt %. The capacity retention rate of the La 0.6 Mg 0.3 Ni 3.45 Nd 0.1 SC alloy after 300 cycles reaches 90.86%.

Are rare-earth-metal-based hydrogen storage materials a problem?

Current Limitations and Issues One of the main challenges facing rare-earth-metal-based hydrogen storage materials is their relatively low actual hydrogen storage capacity compared to the targets set by the U.S. Department of Energy (DOE) for automotive applications.

What are rare earth-magnesium-nickel based hydrogen storage alloys?

The formation of rare earth-magnesium-nickel based hydrogen storage alloys were mainly (La,Mg)Ni₃ phase with a rhombohedral type structure or a (La,Mg)₂Ni₇ phase with a hexagonal type structure.

How to optimize hydrogen storage properties of rare-earth metal alloys and composites?

Rational design of alloys and composites: by carefully selecting the composition and stoichiometry of rare-earth metal alloys and composites, the hydrogen storage properties can be optimized.

How can nanostructuring improve the hydrogen storage performance of rare-earth-metal-based materials?

Nanostructuring is a powerful approach for enhancing the hydrogen storage performance of rare-earth-metal-based materials. By reducing the particle size to the nanoscale, the surface area and the number of active sites for hydrogen absorption and dissociation can be significantly increased.



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