Why can platinum store hydrogen

Could platinum be a key to the energy transition?
Platinum's role in the energy transition could lie in making clean hydrogen technologies commercially viable. Clean hydrogen can be made from decarbonized gas or manufactured using an electrolyzer powered by renewables,to split water into hydrogen and oxygen.

Will platinum make clean hydrogen more competitive?
Platinum will be key to making clean hydrogen technologies competitive- but the rush to acquire it is set to pile pressure on limited supplies. Platinum,a metal more than 30 times rarer than gold,has emerged as a critical mineral in the global energy transition.

How does platinum interact with hydrogen?
The interaction of hydrogen with platinum is enormously important in many areas of catalysis. The most significant of these are in polymer electrolyte membrane fuel cells (PEMFC),in which carbon-supported platinum is used to dissociate hydrogen gas at the anode.

Does platinum have adsorbed hydrogen?
The nature of adsorbed hydrogen on platinum has been studiedfor many years on single-crystal surfaces,on high-surface area-platinum metal (Raney platinum and platinum black),and on supported catalysts.

Does platinum have a high hydrogen storage capacity?
The last observation is consistent with the extremely small solubility of hydrogen in platinum,13 in marked in contrast to the high hydrogen storage capability of palladium,14 irrespective of whether it is a metal black or supported nanoparticles.

Will hydrogen replace platinum?
Hydrogen technologies will therefore be replacing some of platinum's older markets. Contrast this to the situation in the battery sector where users of metals such as lithium and nickel face stiff competition for supply,which has to expand dramatically amid sharply rising demand.

Proton exchange membrane (PEM) electrolysers and PEM fuel cells rely on platinum group metal (PGM) catalysts, notably platinum and iridium. Many see this as a challenge, given the rarity and value of the PGMs. In fact, ...

Platinum-based PEM technology could be a powerful tool in the energy transition, making clean hydrogen and fuel cells more competitive. However, unless action is taken to address the supply-demand gap, scarcity ...

A new catalyst utilizing single atoms of platinum, developed by City University Hong Kong and tested by Imperial College London, promises easier and cost-effective hydrogen storage from renewable energy. The ...

Why can platinum store hydrogen

The interaction of hydrogen with platinum is enormously important in many areas of catalysis. The most significant of these are in polymer electrolyte membrane fuel cells (PEMFC), in which carbon-supported platinum ...

The utility of hydrogen as a fuel is also limited due to its low density, making it difficult to store, and its flammability. The relatively small number of hydrogen vehicles versus EVs, and extremely sparse hydrogen ...

the hydrogen -storage properties are also affected by the electronic states of host materials ; for example, the hydrogen - storage capacity of Pd can be tuned by alloying an additional elemen ...

Figure S1 (Supporting Information) shows a compilation from the literature and the spectra show a remarkable degree of similarity, irrespective of whether the platinum is present as high surface area metal 10a - 10c or as ...

Researchers elucidate mechanisms for controlling the surface oxidation processes that affect the performance of platinum catalysts in alkaline media. Platinum (Pt) electrodes are crucial for clean power technologies like ...

Dihydrogen (H2), commonly named "hydrogen", is increasingly recognised as a clean and reliable energy vector for decarbonisation and defossilisation by various sectors. The global hydrogen ...

Platinum will be key to making clean hydrogen technologies competitive - but the rush to acquire it is set to pile pressure on limited supplies. 72 Member Countries Subscribe. ...

The chemists found that the hydrogen atoms were able to occupy stable sites in the subsurface palladium layer. But their presence seemed to affect the electronic structure of the surface layer, as if the hydrogen atoms were pushing the ...

Walter: Hydrogen is an energy vector in this respect, so it has an ability, when being formed by means of electrolysis, to store energy and this stored energy can then either ...

Why can platinum store hydrogen