Oxygen-deficient solar power generation

How can oxygen deficiency be adjusted?
The oxygen deficiency in the film can be adjusted by controlling the partial pressure of O 2 and laser power density. For instance,Leichtweiss et al. [86]prepared oxygen-deficient titanium oxide films with an average composition of TiO 1.6 by PLD at room temperature,which presented high efficiency for the water-splitting reaction.

Does oxygen deficiency affect photo-generated charge carrier recombination?
For our oxygen-deficient WO 3-x /Zn 0.3 Cd 0.7 S Z-scheme system,the photo-generated holes tend to be present in the VB WO 3-x,while the electrons in the conduction band of WO 3-x combine with the holes of Zn 0.3 Cd 0.7 S through the interface contact. As a result,the photo-generated charge carrier recombination can be significantly decreased.

Can metal oxides be used for hydrogen production using concentrated solar energy?
Abanades, S. Metal oxides applied to thermochemical water-splitting for hydrogen production using concentrated solar energy. Chem. Eng. 2019, 3, 63, DOI: 10.3390/chemengineering3030063 Linic, S.; Christopher, P.; Ingram, D. B. Plasmonic-metal nanostructures for efficient conversion of solar to chemical energy. Nat.

How does solar energy affect hydrogen production?
Hydrogen production relies on the presence of electrical power at the input of the electrolyzer,which is contingent upon the availability of solar radiation. To maximize the solar energy supplied to the load,the availability of solar radiation should match the PV generation.

What are the challenges faced by solar-to-hydrogen conversion?
Key challenges to overcome include relatively low solar-to-hydrogen conversion efficiencies (typically under 5%), and the high costs and photo-assisted corrosion of the covalently bonded semiconducting photoelectrodes that support higher conversion efficiencies.

Do solar irradiance and system size affect hydrogen production?
Overall,it has been proven that solar irradiance and system size played an effective rolein delivering the maximum amount of hydrogen generated by the electrolyzer. Another study was carried out in to find the optimal size of the PV-EL systems aiming to obtain the maximum hydrogen production.

Herein, we fabricated heterostructure consist of oxygen-deficient WO3-x nanorods with Zn0.3Cd0.7S nanoparticles for an efficient Z ...

Safe and efficient power generation technologies using renewable sources are becoming increasingly important for sustainable energy development, with solid oxide fuel ...

To enhance the electrochemical performance of the reversible solid oxide cell (RSOC), a facile way through adopting A-site deficient Pr0.94BaCo1.5Fe0.5O5+d (PBCF94) ...

In this work, we demonstrate a new solar-microbial (PEC-MFC) hybrid device based on the oxygen-deficient Nb 2 O 5 nanoporous (Nb 2 O 5-x NPs) anodes for sustainable ...

SOLAR-BIOGAS HYBRID POWER GENERATION SYSTEM - Download as a PDF or view online for free ...,CO2,H2S and several other gases formed by the biological ...

The solar absorption becomes increasingly stronger with the heat treatment temperature. 1200 °C is an appropriate treatment temperature for oxygen-deficient TiO2 ...

The Qinghai-Tibet Plateau of China is a region of low atmospheric pressure and oxygen deficiency, with a high heating demand in the winter; therefore, plateau hotel buildings ...

DOI: 10.1016/j.solmat.2020.110575 Corpus ID: 218940118; Well oil dispersed Au/oxygen-deficient TiO2 nanofluids towards full spectrum solar thermal conversion ...

This perspective highlights the features of double perovskite electrocatalyst for the oxygen evolution reaction in particular, oxygen-deficient double-perovskite with multiple cationic redox sites. The rational reordering of ...

Electrochemical energy conversion and storage systems are presently playing a lead role in the global energy platform. This study reports the fabrication of a Hydroelectric Cell ...

Among the many already known methods, the construction of oxygen defects has been considered as one of most efficient ways to manipulate the band gap of titanium ...

Oxygen stoichiometry plays a vital role in determining the physical properties of transition metal oxides (TMOs) and their suitability for high-temperature thermoelectric ...

One-step hydrothermal generation of oxygen-deficient N-doped blue TiO 2 -Ti 3 C 2 for degradation of pollutants and antibacterial properties. ... Photocatalysis has emerged ...

The conversion of solar energy into chemical energy is a pivotal factor in the development of the modern energy industry, aimed at augmenting the proportion of renewable ...

Water-electrolysis-based solar methanol production serves as a flexible load to use surplus solar power, and the pure oxygen from water electrolysis is used in the natural gas ...

Nelumbo nucifera, the lotus flower, is a typical swamp plant in the monsoon climate of northern Australia. The rhizomes grow in the oxygen-deficient mud and are supplied ...

Then, the next section outlines the modification approaches of oxygen-deficient titanium oxide (TiO2-d) to further improve its photocatalytic performance. ... such as solar ...

Recent examples of materials that have been studied for solar-driven, thermochemical fuel production include zinc oxide (ZnO) decomposition into Zn metal or the reduction of cerium dioxide (CeO 2) to its oxygen-deficient ...

So far, solar steam power generation technology using local heating at the air-water interface has received widespread attention mainly because it can considerably ...

Here, we present oxygen-deficient black ZrO 2-x as a new material for sunlight absorption with a low band gap around ~1.5 eV, via a controlled magnesiothermic reduction in ...

Discussing the cathodes (oxygen or air electrodes), one of the most interesting and promising materials for IT-SOFCs are the layered oxygen-deficient double perovskites, Ln ...

Here, we present oxygen-deficient black ZrO2-x as a new material for sunlight absorption with a low band gap around ~1.5 eV, via a controlled magnesiothermic reduction in ...

The pioneering process of employing oxygen-deficient reducing flame enabled a series of photo-catalytically active metal sulfide nanoparticles with work function energies in ...

Moreover, oxygen-deficient Nb 2 O 5 phases become more stable at high temperatures [31], [32], so ultrafast laser processing may be used to generate oxygen ...

Oxygen vacancies implantation is an efficient way to adjust the physical and chemical properties of metal oxide nanomaterials to meet the requirements for particular applications. Through reasonable defects design, ...

Titanium dioxide (TiO2) as a common photothermal material usually faces with low photothermal conversion efficiency, mainly owing to the little utilization of visible (Vis) and ...

Oxygen vacancies implantation is an efficient way to adjust the physical and chemical properties of metal oxide nanomaterials to meet the requirements for particular ...

For WO 3 /TNT and Cu/WO 3 /TNT films, another semiconductor with band-gap about 2.4 eV can be found, which can be ascribed to the oxygen-deficient WO 3. It is reported that W 18 O 49 ...

Electrochemical energy conversion and storage systems are presently playing a lead role in the global energy platform. This study reports the fabrication of a Hydroelectric Cell (HEC) via the ...

Here we present the successful scaling of a thermally integrated photoelectrochemical device--utilizing concentrated solar irradiation--to a kW-scale pilot plant ...

Literature surveys indicate that oxygen-deficient titanium oxide (TiO 2-d) can absorb more visible light than stoichiometric TiO 2, and the formation of oxygen defects in titanium oxide could also enhance its electrical ...

Here, we present oxygen-deficient black ZrO2-x as a new material for sunlight absorption with a low band gap around ~1.5 eV, via a controlled magnesiothermic reduction in 5% H2/Ar from ...