Solar cycle reoxygenation system

Can solar-powered redox processes improve sustainability?
Integrating reforming into solar-powered redox processes takes a large step towards improving the sustainabilityof fuel and chemical production processes in circular chemical industries and could ultimately find large-scale applications in the form of solar-powered reforming plants or solar refineries.

How can two-step thermochemical cycling improve the efficiency of solar energy?
In most cases,the coupled system improves the efficiency by more than 30%. Solar-driven two-step thermochemical cycling is a promising means to convert solar energy into storable and transportable chemical fuel,in which hydrogen or carbon monoxide is generated by continuous reduction and oxidation reactions.

How can oxygen carriers be reduced in the chemical-looping cycle?
The oxygen-carriers in the chemical-looping cycle can be reduced by adding reductants or direct heating with waste heat from the thermochemical cycle. The coupled system can remove the oxygen in the thermochemical cycle reduction reaction and reduce the energy consumption in this process.

How does solar reforming work?
By coupling the thermodynamically favourable oxidation of waste-derived organic carbon streams with fuel-forming reduction reactions suitable for producing clean hydrogen or converting CO2 to fuels, solar reforming simultaneously valorizes waste and generates useful chemical products.

Solar-driven thermochemical redox cycles for H 2 O/CO 2 splitting are promising processes for sustainable fuel production, directly storing solar energy into energy-dense chemicals ...

Organic Rankine Cycle is a technology that convert low-temperature heat sources into a mechanical energy, and it can be used to produce electrical energy in a closed system. The heat ...

Hypoxia is common to shallow ice-covered lakes during the winter season, and restorative actions to prevent impacts to aquatic ecosystems are desired yet untested in remote ...

A solar-driven saline soil leaching system, featuring a closed-loop water cycle without requiring additional maintenance, was proposed for sustainable saline soil remediation for the first time.

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1. Introduction Concentrated solar power is a renewable energy source for process heat supply to drive high-temperature thermochemical reactions, such as pyrolysis, reforming, and ...

This Review introduces solar reforming as an emerging technology to produce sustainable fuels and chemicals from diverse waste feedstocks using sunlight. The chemistry ...

nerable to extreme climate dis-turbances, and has limited adaptability to water bodies with high pollution loads [14, 28, 29]. In view of this, this study has developed a solar-powered intelligent water ...

The coupled system can improve the solar-to-fuel efficiency by 45.9% to 20.9% and improve the solar-to-electricity efficiency by 104.1% to 14.6% without heat recovery compared to ...

ORC is a cycle like the conventional water/steam Rankine cycle but it works with organic fluids and generally is a less complex unit than the water/steam Rankine cycle [6]. The typical design ...

With the advent of green technologies, solar fuel has gained particular interest that helps in producing syngas which is the primary feedstock for many of the synthetic chemicals using ...

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