Let water automatically generate electricity from solar energy

Can solar energy solve the water-energy dilemma in an eco-friendly way?

As an abundant and ubiquitous energy source,solar energy has successfully demonstrated its potentialin tackling the water-energy dilemma in an eco-friendly way. In this issue of Joule,Wenbin and co-authors creatively propose the co-generation of electricity and freshwater via an integrated PV-membrane distillation system.

Can a solar cell transform a water consumer to a fresh water producer?

This strategy provides a potential possibilityto transform an electricity generation plant from otherwise a water consumer to a fresh water producer. The solar cell harvests short wavelength sunlight to generate electricity via photovoltaic effect,which results in a high solar-to-electricity energy efficiency.

Can a solar cell produce energy and clean water?

The increasing demand for energy and clean water has become a grand global challenge. Here the authors develop a membrane-distillation device that exploits sunlight and the heat dissipated by an integrated solar cell unit,enabling simultaneous efficient production of electricity and drinkable water.

How much water does a solar system produce?

As a result,the integrated system achieves an impressive water production rate of 4.14 kg m -2 h -1while simultaneously maintaining a high electricity generation efficiency of 16.4 % under 1 sun,therefore maximizing the total solar energy conversion.

The energy shortage and clean water scarcity are two key challenges for global sustainable development. Near half of the total global water withdrawals is consumed by power generation plants ...

This integrated system sets a pioneering example of clean water and electricity co-generation with minimized carbon footprint, extending the applicability of ground-mounted solar ...

Photovoltaic solar panels absorb sunlight as a source of energy to generate direct current electricity. Solar power is anticipated to become the world"s largest source of electricity by 2050, with solar ...

Solar-driven atmospheric water extraction (SAWE) systems have the potential to address the ongoing freshwater scarcity, but they can only produce water intermittently. Here the authors ...

Structure of the MSMD device The solar cell harvests short wavelength sunlight to generate electricity via photovoltaic effect, which results in a high solar-to-electricity energy efficiency ...

In a world where over 2 billion people face water scarcity, atmospheric Water Generators (AWGs) emerge as a beacon of hope, harnessing air"s humidity to produce clean water. When paired ...

As an abundant and ubiquitous energy source, solar energy has successfully demonstrated its potential in

tackling the water-energy dilemma in an eco-friendly way. In this issue ...

Here we present an integrated desalination-power generation-cultivation trinity system. All from solar energy, we could obtain fresh water, electric power and crop cultivation media.

This project explores the integration of water and solar power to create a hybrid electricity provider, aiming to address energy shortages and environmental concerns while leveraging ...

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