

Title: Membrane-based solar power generation

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Are PIL/MXene composite porous membranes suitable for solar-driven clean water production?

In this contribution, we synthesized PIL/MXene composite porous membranes via ionic complexation and successfully applied them in solar-driven clean water production. The as-prepared composite porous membranes maintained structural stability and integrity as compared to a pristine PIL porous membrane.

Could water be a source of energy for membrane-based systems?

Water has always been crucial to combustion and hydroelectric processes, but it could become the source of power in membrane-based systems that capture energy from natural and waste waters. Two processes are emerging as sustainable methods for capturing energy from sea water: pressure-retarded osmosis and reverse electro dialysis.

What are the advantages of PIL/MXene porous membrane?

Owing to advantages of ionically crosslinked structure of PIL/MXene porous membranes, the porous composite membrane is tuneable with controllable thickness in the range of 15-180  $\mu$ m, being an ideal solar absorber required for the design of a solar-driven vapor generator with high evaporation rate and efficient energy conversion.

What is solar-driven interfacial water-electricity cogeneration?

Since Xue et al. first proposed electricity generation induced by a water evaporation process based on a hydrovoltaic effect, solar-driven interfacial water-electricity cogeneration has emerged as a promising solar energy utilization technology for clean water and energy collection [4,5,6].

This work presents a synergistic strategy for salt resistance, water purification and energy generation, advancing the design of solar-thermal-electric integrated systems.

Harvesting solar energy in an effective manner for steam and electricity generation is a promising technique to simultaneously cope with the energy and water crises. However, the ...

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We developed a novel hydrovoltaic power generator (HPG) using a Janus bilayer membrane with an

asymmetric wettability. The Janus bilayer membrane was fabricated by stacking a ...

The global pursuit of sustainable development is increasingly constrained by freshwater scarcity and the growing energy crisis. Integrating solar-powered hybrid systems that couple ...

This paper presents the performance and behavior of a novel system of integration of an anion exchange membrane (AEM) based water electrolyzer (AEMWE) and fuel cell (AEMFC) with ...

Overall biochar photothermal membrane represents a significant advancement as low-cost sustainable technology, addressing both water and energy challenges by providing efficient, ...

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Abstract The integration of ionic power generation with solar-driven water evaporation presents a promising solution to the critical global problems of freshwater scarcity and clean energy ...

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