

PIENAAR ENERGY (PTY) LTD

Research on liquid solar power generation materials



Overview

This paper presents a thorough review on basics and applications of liquid metal technology in solar power generation. Specifically, three typical liquid metal materials, including liquid metal fluids, liquid metal thermal interface materials, and liquid metal phase change. In solar power generation, not only does the heat transfer significantly affect the energy conversion efficiency, but it also determines the stability and durability of the optoelectronic materials. Therefore, special attention has been given to the development of advanced heat transfer materials. To reduce the levelized cost of energy for concentrating solar power (CSP), the outlet temperature of the solar receiver needs to be higher than 700 °C in the next-generation CSP. Because of extensive engineering application experience, the liquid-based receiver is an attractive receiver technology. Harnessing the power of the sun to produce energy-rich chemicals directly from abundant feedstocks such as water, carbon dioxide (CO₂), and nitrogen (N₂) promises a plentiful supply of sustainable, transportable, and storable solar fuels to meet future US energy needs. Furthermore, solar fuels can.

Research on liquid solar power generation materials



Materials for solar-powered water evaporation

We discuss how to integrate photothermal materials, nanostructures/microstructures and water-material interactions to improve the performance of the evaporation system via in situ utilization

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Basic Energy Sciences held a Roundtable on Liquid Solar Fuels in August 2019 to examine fundamental challenges and research opportunities for generating energy-rich liquids from abundant feedstocks ...



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Hydrovoltaic Power Generation Depend on Wettability at the Liquid...

Based on these principles of power generation, there is a need to classify hydrovoltaic power generation in terms of materials and water sources to facilitate the research and application of ...

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Liquid metal technology in solar power generation

This paper presents a thorough review on basics and applications of liquid metal technology in solar power generation. Specifically, three typical liquid metal materials, including liquid ...

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Materials for solar-powered water evaporation

We discuss how to integrate photothermal materials, ...

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(PDF) Liquid metals for solar power systems

In this paper, recent activities of the Helmholtz Alliance LIMTECH concerning liquid metals for solar power systems are presented. In addition to the components and system simulations also

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Liquid Metal-Polyphenol Hybrids for Solar Steam Generation



Here, a natural polyphenol-based gel composite incorporating liquid gallium particles and graphene is presented, engineered for high-performance solar-driven desalination. This synergistic ...

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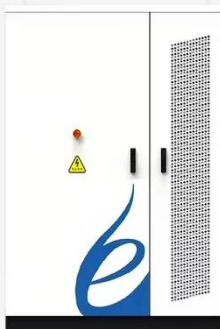
Liquid-based high-temperature receiver technologies for next

...

Because of extensive engineering application experience, the liquid-based receiver is an attractive receiver technology for the next-generation CSP. This review is focused on four of the most ...



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Polyphenol-Mediated Liquid Metal Composite Architecture for Solar

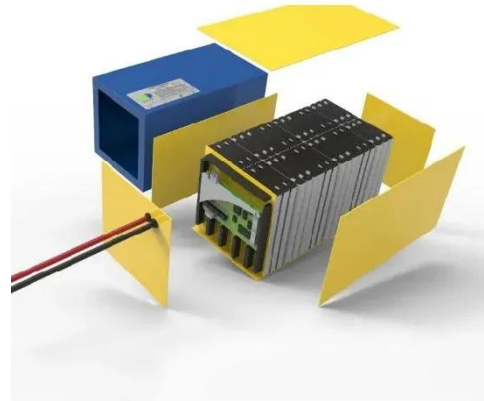
As such, the photothermal composite exhibits a broad-spectrum light absorption and highly efficient solar-to-heat conversion.

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Continuous efforts are in progress to demonstrate the scalability, reliability, functionality, and performance of different concentrated solar thermal components and liquid heat transfer fluids ...

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