

Can daytime radiative cooling and photovoltaic power generation work together?

In a recent issue of Cell Reports Physical Science, Zhu and colleagues unveil a system that remarkably achieves simultaneous daytime radiative cooling and photovoltaic (PV) power generation within the same spatial footprint, establishing a new strategy to unlock the full potential of both renewable energy sources.

Does daytime radiation cooling work with solar cells?

However, its compatibility with solar cells for efficient energy conversion has posed challenges due to the need to reflect sunlight. Herein, we have successfully developed a transmission-type daytime radiation cooling system and designed a tandem structure that integrates daytime radiative cooling with solar cells.

Can tandem daytime radiative cooling and solar power generation improve device performance?

Simulation results demonstrate that increasing the heat transfer efficiency of cooling and reducing the absorptivity in the sunlight band of the emitter can further enhance device performance. This outcome presents a novel approach toward enhancing the practical implementation of tandem daytime radiative cooling and solar power generation.

What is a transmission-type daytime radiation cooling system?

Based on this, we constructed a transmission-type daytime radiation cooling system that consists of a left-right interconnected chamber to facilitate the extraction of cooling generated by radiative materials through air circulation.

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Daytime radiative cooling and photovoltaic energy generation are poorly compatible, as they have competing physical demands. Here, a transmission-based radiative cooling system is ...

The daytime radiative cooling technique effectively dissipates heat by emitting thermal radiation while re-reflecting a majority of sunlight. However, its compatibility with solar cells for efficient ...

Considering that radiative cooling requires efficient sunlight reflection, the integration of radiative cooling with solar cells poses a considerable challenge. To tackle this issue, Jia et al. ...

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Improving daytime loads can mitigate some of the challenges posed by solar variations in solar-integrated power systems. Thus, this simulation study investigated the different levels of ...

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