

What are solar-driven photothermal materials?

Solar-driven photothermal materials are promising platforms for addressing global energy challenges and environmental issues. Solar energy mainly focuses on the wavelength range from 300 to 2500 nm (Figure 3a), which occupies over 98% of solar energy.

How do semiconductors convert solar energy into heat?

Semiconducting materials convert solar energy into heat by absorbing the photon energy larger than their bandgaps, so that electrons in the valence band (VB) are able to be excited to the conductive band (CB). Next, excitation-state electrons and holes are produced in the CB and VB, respectively.

Can photo-thermoelectric power generation technology be used in wearable electronics?

Photo-thermoelectric power generation technology can be widely applied in wearable electronics and micro-electronic chips due to low voltage and small electricity outputs. Ho's group reported a flexible and thermal insulative organic light absorber sponge for electric power and water vapor cogeneration.

Can solar power be produced through photo-thermoelectric effect?

Apart from PV electric power generation, [12,67] electric power could also be produced through the photo-thermoelectric effect in which solar energy is utilized by combining light absorber and thermoelectric modules.

What are the mechanisms of solar-driven photothermal conversion?

First, four types of fundamental mechanisms of solar-driven photothermal conversion have been summarized, including non-radiative relaxation of semiconductors, plasmonic heating of metals, thermal vibrations of organic molecules and multiple interactions of micro/nanostructured materials.

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Thermoelectric materials convert waste heat into electricity, making sustainable power generation possible when a temperature gradient is applied. Solar radiation is one potential abundant and eco-friendly heat source for this application, ...

In comparison with the expensive chemical energy storage (mainly batteries) typically applied to wind and solar photovoltaic power stations, the TES-based CSP plant has a great benefit in long-term energy storage with low cost. 1-3 ...



Applied Materials enters solar power generation

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