

# Butterfly system solar thermal power generation

Do butterfly wings increase solar power?

Here, we show that the attachment of butterfly wings to a solar cell increases its output power by 42.3%, proving that the wings are indeed highly reflective. Importantly and relative to current concentrators, the wings improve the power to weight ratio of the overall structure 17-fold, vastly expanding their potential application.

What is a butterfly solar concentrator?

The V-shaped design of the butterfly is therefore strikingly similar to the V-trough solar concentrator which uses mirrored side walls to focus light towards a small area of photovoltaic material 3, 26 ( Fig. 1d) thereby increasing the output power of any solar cell to which it is attached 4, 27. White butterflies as solar concentrators.

Does a white butterfly mimic a Photovoltaic concentrator?

To improve both the gathering of thermal and photovoltaic energy from the sun we have examined the concept of biomimicry in white butterflies of the family Pieridae. We tested the hypothesis that the V-shaped posture of basking white butterflies mimics the V-trough concentrator which is designed to increase solar input to photovoltaic cells.

Can biomimicry improve photovoltaic energy harvesting in white butterflies?

Man's harvesting of photovoltaic energy requires the deployment of extensive arrays of solar panels. To improve both the gathering of thermal and photovoltaic energy from the sun we have examined the concept of biomimicry in white butterflies of the family Pieridae.

Do butterfly wings have a concentrating effect?

In terms of increased solar input (solar concentration) this works out as a concentrating effect of 1.3x, compared to the 2x concentration achieved by the reflective film. However in terms of weight, the butterfly wings have 17x the power to weight ratio of the reflective film structure.

What are the possible optical losses in a butterfly wing configuration?

The possible optical losses in the butterfly wing configuration include; light rays incident upon the wings but which are reflected to the front or rear -where there is no wing or body coverage- or even back out the top opening area and also the efficiency at which the wings reflect the light--the reflectance.

The invention discloses a butterfly type solar heat storage photo-thermal power generation system, and relates to the technical field of solar power generation. The solar...

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Butterflies utilize a variety of evolutionary refined structures and behaviors to optimize solar energy harvesting that can inspire more efficient and sustainable solar solutions. A core technique is the intricate texturing of wing scales to trap light from many incident angles.

To address the issues, a novel butterfly serpentine flow pattern was developed and analyzed for a PV thermal collector (PV/T) system and a PV/T heat pump (PV/T-HP) system with and without ...

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Coordinated power control with real-time communication delay in grid integrated VPP in presence of CRSTS, WTG, and EV is a novel approach. Genetic algorithm (GA), Particle Swarm Optimization...

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A technology of photothermal power generation and solar energy, applied in the field of solar power generation, can solve the problems of large power consumption and shortened service life, and achieve the effects of reducing maintenance costs, improving heat collection efficiency, and extending the service life

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A butterfly type solar thermal power generation system comprises a butterfly type condenser, a receiver, a combustion chamber, a gas turbine, a compressor and a power generator....

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This study optimized grid intermittency and instability resulting from photovoltaic (PV) by adding concentrating solar power (CSP) equipped with thermal energy storage (TES), which can be used to form hybrid solar power for grid dispatching. The PV-CSP were optimized by using a hybrid butterfly algorithm to meet the power generation demands ...

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