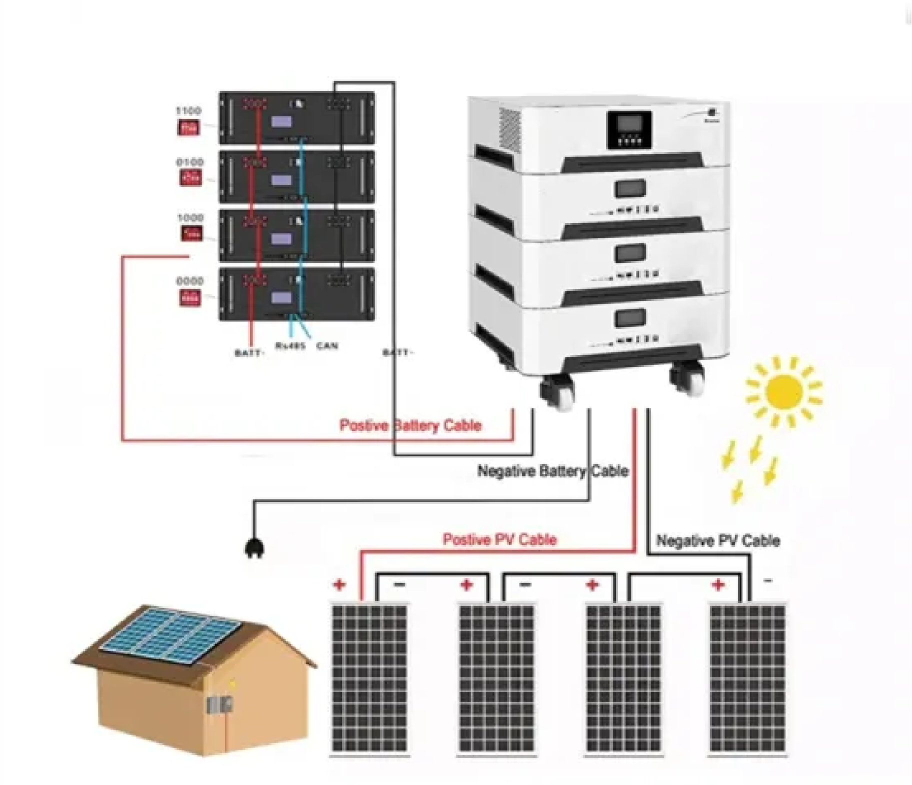
PEES Power Systems

Rhodopsin Solar Power



Overview

Some bacteria have the ability to convert solar energy into chemical energy – not unlike photosynthesis in plants. They can do so thanks to a protein called rhodopsin. Over millions of years, a clear distinction has evolved between heterotrophic cells and phototrophic bacteria. Jarone Pinhassi is working to ascertain how this happens and also highlights the importance of the process in global carbon. Although rhodopsins are known as light activated proton-pumps, able to power Adenosine triphosphate (ATP) synthesis, their role in microbial carbon fixation has remained elusive. Inspired by the chlorophyll-based photosynthesis system, researchers in the Engineering Science Department led by. All known phototrophic metabolisms on Earth rely on one of three categories of energy-converting pigments: chlorophyll-a (rarely -d), bacteriochlorophyll-a (rarely -b), and retinal, which is the chromophore in rhodopsins.

Rhodopsin Solar Power

Microbial rhodopsins are major contributors to the solar energy

First quantifications of marine microbial rhodopsin reveal a major role in solar energy capture in the surface ocean.

Microbial rhodopsins are major contributors to the solar energy

We report the first vertical distributions of the three energy-converting pigments measured along a contrasting nutrient gradient through the Mediterranean Sea and the Atlantic Ocean.

Recent advances in bacteriorhodopsin-based energy harvesters and

Due to its unique properties, bR can be used in a wide variety of fields, including solar power production, fuel cells, military camouflage, optical devices (photodetectors and artificial ...

Rhodopsin-based light-harvesting system for sustainable synthetic

Rhodopsin has a wide range of uses as an important element of sustainable synthetic biology, with potential applications across diverse fields, such as bioproduction, solar energy conversion, ...

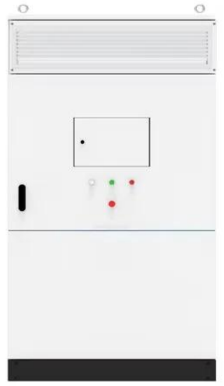
How bacteria use solar energy to grow , Knut and Alice Wallenberg

Some bacteria have the ability to convert solar energy into chemical energy - not unlike photosynthesis in plants. They can do so thanks to a protein called rhodopsin.

Artificial photosynthesis demonstrates high energy transfer efficiency

In contrast, rhodopsin only has one simple protein, able to express it in many different organisms. It has been discovered that microbial rhodopsins are also major contributors to solar energy capture on ...

Solar-Powered Cells in Fuel? Scientists Engineer Yeast that



Harness

While studying microbes found at the ocean's surface, several scientists from USC found that rhodopsin-driven photosynthesis can absorb just as much light energy as traditional chlorophyll ...

The role of carotenoids in proton-pumping rhodopsin as a primitive

Here, our results suggest a new possibility, in which the carotenoid was used by microbial rhodopsin to enhance the capturing of solar energy and promote its proton pumping ability.

Engineering artificial photosynthesis based on rhodopsin for CO2

In the artificial photosynthesis system, light energy is absorbed by a solar panel and rhodopsin to generate electricity and drive the metabolism, respectively.

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