

Are organic photovoltaics a smart greenhouse?

Hence, a smart greenhouse with semi-transparent organic photovoltaics (OPVs) integrated into the power-generating roof is highly desirable for modern agriculture 2, 3. Due to the unique band structure of organic materials, OPVs are able to selectively absorb light with a desired wavelength 4, 5, 6.

Are greenhouse photovoltaics the future of Agriculture?

Greenhouse photovoltaics are promising for the mass scale of advanced agricultural activities, by providing not only off-grid and rooftop power supplies but also by providing enough sunlight for plant growth.

What is a typical Chinese solar greenhouse?

Cross-section of a typical Chinese solar greenhouse. In addition to Chinese solar greenhouses, there are also facility cultivation units known as Gobi cropping systems. These cultivation systems used in China make full use of crop straw, animal manure, and other agricultural wastes to create a cultivation substrate for crop cultivation.

What systems are used in modern greenhouses in China?

At present, the most common automated systems in modern greenhouses in China mainly include intelligent water and fertilizer supply integration, air temperature control, and ventilation systems. Carbon dioxide is important for plant photosynthesis and it affects the yield of vegetables produced in greenhouses.

Can a solar greenhouse model be used for climate simulation?

The developed model is a universal and valuable approach that can be used for greenhouse climate simulation. Furthermore, it can be used as a support system during decision-making processes to help manage Chinese solar greenhouses more efficiently, which provides several control perspectives on the low-energy greenhouse in the future.

Can semitransparent organic solar cells be self-powered greenhouses?

Unlike the traditional opaque photovoltaics, semitransparent organic solar cells (ST-OSCs) exhibit merits of being transparent, lightweight, and having good solution processability, as self-powered greenhouses.

Although PV power generation is nearly "zero emissions" during operation and could indeed help to substantially reduce carbon emissions [8] [9] [10][11][12][13], its emissions should not be ...

Greenhouse planting is of great significance to the modernization of agriculture. The advent of photovoltaic greenhouses has increased the land use rate compared with the original ...

A numerical simulation of the photovoltaic greenhouse microclimate. Solar Energy, 2015; 120: 575-584.

Foster R, Cota A. Solar water pumping advances and comparative economics. ...

This research explores the social influence on consumers' purchase willingness or intention of solar photovoltaic panels in the online context and finds that source credibility ...

Li Zhenfa, Liu Tao, Dong Chaoyang, Xue Qingyu, Liu Shumei. Climate classification of solar greenhouse based on the calculation method for indoor and outdoor temperature difference at ...

Our study highlights the importance of the operational stability of OPVs and the reciprocity between photovoltaic and photosynthetic systems through the integration of the ...

In order to study the adaptability of photovoltaic greenhouses to climate in tropical areas, a photovoltaic greenhouse model (photovoltaic panel coverage rate: 76.9%) was built in this ...

Several authors reported that the external integration of photovoltaic panels on the greenhouse could decrease the internal light intensity and air temperatures (Friman-Peretz ...

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