

Greenhouse thin film solar photovoltaic power generation

What is a thin-film photovoltaic (PV) system?

Thin-film photovoltaic (PV) systems such as amorphous silicon(a-Si),cadmium telluride (CdTe),and copper indium gallium diselenide (CIGS) are expanding rapidly due to their low cost,ease of manufacturing,advancing conversion efficiency,and competitive sustainability indicators.

Can photovoltaics be used in greenhouses?

The integration of photovoltaics (PV) into greenhouses is analyzed. Greenhouse energy demands,PV performances and effects on crop growth are reported. The application of organic,dye-sensitized and perovskite solar cells is described. The new PV technologies can promote sustainable,self-powered and smart greenhouses.

How can PV technology improve the sustainability of greenhouses?

The new PV technologies can promote sustainable,self-powered and smart greenhouses. Reducing the energy demand and dependency on fossil fuels is crucial for improving the sustainability of greenhouses,which are the most energy intensive systems in the agricultural sector.

How does a thin-film PV module affect energy consumption?

Hotspot analyses of the primary energy demand at module level in 15 studies pointed out to large impacts stemming from electricity consumption during metal deposition processes with requirements for vacuum environment and high temperatures; stakeholders in thin-film PV should therefore closely monitor these processes.

Can traditional PV systems be used for greenhouse application?

The use of traditional PV systems for greenhouse application has to take into account their integration on existing structures and glazing,as well as the trade-off between PV and plant requirements for the respective electrical and crop production.

Which solar cells are suitable for greenhouse integration?

New generation technologies in PV,such as organic solar cells (OSCs),dye-sensitized solar cells (DSSCs) and perovskite solar cells (PSCs),are suitable candidates for greenhouse integration due to the possibility of inherent semi-transparency and flexibility.

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