

SolarTech Power Solutions

Ultra-thin lightweight glass photovoltaic modules



Overview

Scientists at the Korea Institute of Energy Research (KIER) have developed a CIGS solar cell with ultra-thin glass (UTG), an emerging substrate known for its exceptional flexibility and stability. Are ultra-thin organic photovoltaics scalable?

To date, demonstrations of such ultra-thin photovoltaics have been limited to small-scale devices, often prepared on glass carrier substrates with only a few layers solution-processed. We demonstrate large-area, ultra-thin organic photovoltaic (PV) modules produced with scalable solution-based printing processes for all layers.

Can a bulk heterojunction material be used for large-area photovoltaic modules?

Prior to developing a process to build fully-printed large-area photovoltaic modules, an organic bulk heterojunction material system was selected and evaluated for its suitability for such an application, on small-scale glass substrates with sputtered transparent electrodes.

What are thin-film photovoltaics?

Thin-film photovoltaics with functional components on the order of a few microns, present an avenue toward realizing additive power onto any surface of interest without excessive addition in weight and topography.

Can cadmium-free solar cells be used on ultra-thin glass?

The new cell concept was introduced in the study “ High-efficiency cadmium-free Cu (In,Ga)Se 2 flexible thin-film solar cells on ultra-thin glass as an emerging substrate,” published in the Journal of Alloys and Compounds.

How much does a silicon PV module weigh?

For comparison, we note that silicon PV modules on glass substrates have a specific power of 20 W/kg and weigh 10.7 kg m⁻² (for example, see

SunPower's Maxeon Gen 5, 400 W Residential A-Series Panels), 18-times less power per kg, and 100-times more weight per m², than our fabric-PV modules.

Can ultra-thin modules be integrated into fabric-PV systems?

Integration of the ultra-thin modules onto composite fabrics lends mechanical resilience to allow these fabric-PV systems to maintain their performance even after 500 roll-up cycles. This approach to decouple the manufacturing and integration of photovoltaics enables new opportunities in ubiquitous energy generation.

Ultra-thin lightweight glass photovoltaic modules



Transparent Tedlar® Frontsheet for Lightweight PV Module ...

Jun 16, 2023 · The main challenge in achieving lightweight PV modules is replacing the glass frontsheet while maintaining transparency, mechanical stability and weatherability over the ...

Narrow Bandgap CIGS Solar Cells on Flexible, Light Weight Glass

Jun 14, 2024 · CIGS absorbers with a near-infrared bandgap make excellent candidates for a bottom cell in multi-junction solar cell designs. These devices, available in flexib.



Advancements In Ultra-Thin Solar Glass: Benefits And

Jul 26, 2024 · Advancements in ultra-thin solar glass are revolutionizing the field of photovoltaic (PV) systems. This new technology involves producing solar glass with a thickness of as little ...

Optimization of large-area photovoltaic module frames for lightweight

Jun 15, 2025 · In this study, we used the non-dominated sorting genetic algorithm-II (NSGA-II), a meta-heuristic optimization technique, and structural analysis simulation to design a ...



2MW / 5MWh
Customizable



Ultrathin Glass for the Photovoltaic Applications

Mar 9, 2021 · In this work we demonstrate that chemically strengthened ultrathin glass is a perfect material for the photovoltaic applications, i.e. as a substrate for deposition of thin layers and for ...

High-efficiency cadmium-free Cu(In,Ga)Se₂ flexible thin-film ...

Apr 20, 2025 · This study successfully demonstrated high-efficiency Cu (In,Ga)Se₂ (CIGSe) thin-film solar cells on flexible ultra-thin glass (UTG) substrates, balancing mechanical flexibility ...



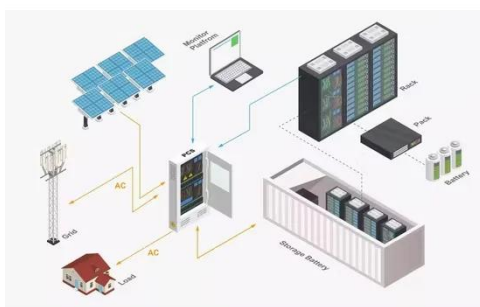
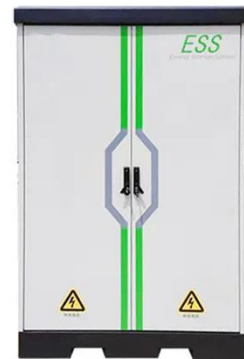


Ultra-thin Rolled Photovoltaic Glass - New Way ...

Jun 16, 2024 · Improving the transmittance of ultra-thin photovoltaic glass can effectively enhance the efficiency of solar photovoltaic modules. The industry ...

Physical Properties of Glass and the Requirements for ...

Feb 16, 2011 · NREL Photovoltaic Module Reliability Workshop February 16, 2011 Photovoltaic Glass Technologies Corning has a long history of life-changing innovations Glass envelope for ...



In situ vapor-deposited parylene substrates for ultra-thin, lightweight

Apr 1, 2016 · We use in situ vapor-phase growth of smooth, transparent, and flexible parylene-C films to produce ultra-thin, lightweight molecular organic solar cells as thin as 2.3 μm including ...

Printed Organic Photovoltaic Modules on Transferable Ultra-thin

Dec 9, 2022 · To date, demonstrations of such ultra-thin photovoltaics have been limited to small-scale devices, often prepared on glass carrier substrates with only a few layers solution ...



51.2V 150AH, 7.68KWH

Ultra-thin PV Glass-Quantum Materials Technology (Suzhou) ...

Despite their thinness, ultra-thin PV glass panels can achieve high energy conversion efficiencies comparable to traditional PV modules. Advances in materials and manufacturing processes ...

Perovskite Photovoltaics on Roll-To-Roll Coated Ultra-thin Glass ...

May 20, 2020 · Such high efficiencies of PV cells on ultra-thin glass opens up the potential for these devices to be integrated in portable devices, wireless sensor nodes, and low-power ...



ENERGY STORAGE SYSTEM

Product Model
HJ-ESS-215A(100KW/215KWh)
HJ-ESS-115A(50KW/115KWh)

Dimensions
1600*1280*2200mm
1600*1200*2000mm

Rated Battery Capacity
215KWH/115KWH

Battery Cooling Method
Air Cooled/Liquid Cooled



INSTRUCTIONS FOR

PREPARATION OF PAPERS

Sep 23, 2022 · The lightweight solar module is achieved by replacing the standard glass frontsheet by a thin transparent polymeric layer and by engineering the backsheet to replace ...



Inventions, innovations, and new technologies: Flexible and lightweight

Sep 1, 2023 · For flexible PV, ultra-thin flexible glass substrates might have issues with this semiconductor because of dissimilar thermal expansion coefficients compared to soda-lime glass.



Effect of bending test on the performance of CdTe solar cells ...

Jul 1, 2020 · Ultra-thin glass (UTG) however is far better suited and can yield a lightweight and flexible, in 1-dimension, PV module. The suitability of UTG substrates to roll-to-roll processes ...

Ultra-thin PV Glass-Quantum Materials Technology (Suzhou) ...

Ultra-thin PV glass is significantly lighter than conventional glass, making it easier to handle, transport, and install. This characteristic is particularly advantageous for applications where ...



Narrow Bandgap CIGS Solar Cells on Flexible, Light Weight Glass

Jun 14, 2024 · CIGS absorbers with a near-infrared bandgap make excellent candidates for a bottom cell in multi-junction solar cell designs. These devices, available in flexible and ...

Heliup switches on 100 MW lightweight solar panel factory ...

May 29, 2025 · Heliup has commissioned a 100 MW factory in France to produce lightweight solar panels for flat commercial and industrial (C& I) rooftops with limited load-bearing capacity, ...



Towards fiber-reinforced



front-sheets for lightweight PV modules ...

Oct 15, 2024 · Novel approaches in the field of photovoltaics, such as building or vehicle integration require investigations of lightweight PV module concepts [1]. This research ...

Building-integrated photovoltaic applied Bi- facial photovoltaic module

Jun 1, 2024 · Most photovoltaic modules typically exhibit a structure configuration of either glass-to-back sheet or glass-to-glass. These configurations are widely used in standard construction ...



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