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SolarInnovate Energy Solutions

German perovskite photovoltaic tile solution

Overview

What is a perovskite solar cell?

Perovskite solar cells come in various guises. The classic design features a mesoporous layer of metal oxides with a structure much like that of dye-sensitized solar cells. Another variant is the inverted planar solar cell. It is similar to organic solar cells, but has a perovskite layer instead of the organic absorber layer.

Can perovskite photovoltaics be used in tandem solar cells?

To enable cost reduction in photovoltaics by increasing the efficiency of solar cells in the future, intensive research is carried out on alternatives. Its advantageous properties make perovskite photovoltaics interesting to be combined with silicon or other photovoltaic absorber materials in so-called tandem solar cells.

Can perovskite solar cells be combined with silicon solar cells?

These semiconductor compounds can be ideally combined with silicon solar cells to form tandem cells. The perovskite solar cell primarily converts the short-wave light and the silicon cell the long-wave light in the red and near-infrared range into power.

Can metal halide perovskite absorbers improve solar cell efficiency?

These employ metal halide perovskite absorbers, a novel material with excellent optoelectronic properties, a tunable bandgap and a promising low-cost fabrication. In combination with a second absorber in so-called tandem solar cells, a significant improvement in solar cell efficiency can be realized, above the limit of single-junction solar cells.

Can perovskite photovoltaics be scalable?

Upscaling perovskite photovoltaics from cell to module level with scalable processes is a key challenge. Researchers at IMT and LTI have now produced

perovskite solar modules with almost no loss of scaling. They combine laser-scribed interconnection lines with the ease of co-evaporated perovskites.

Can perovskites be used in multi-junction solar cells?

This makes perovskites interesting for use in multi-junction solar cells: by stacking several perovskite solar cells with different band gaps, the efficiency can be significantly increased and exceed the theoretical maximum of single-junction solar cells.

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