

PEROVSKITE PHOTOVOLTAICS

Another good match*Science* **361**, 904–908 (2018)

In the past decade, metal halide perovskites have shaken up the photovoltaic world and are now aiming to enter the market by working in tandem with other solar cells. Among these, a particularly promising tandem partner is Cu(In,Ga)Se₂ (CIGS), a thin-film technology like perovskites, which would enable tandem cells to be deployed in flexible devices and building integrated photovoltaics. However, efficiency improvements in such monolithic tandem cells are challenged by the roughness of the CIGS surface, making the deposition of the perovskite cell difficult. Now, Qifeng Han, Yang Yang and colleagues in the USA and Japan carefully engineer the layers that connect the CIGS and perovskite sub-cells, thus achieving efficiencies beyond 22%.

To control roughness, the researchers introduce a polished interlayer of indium tin oxide (ITO) that smooths out the CIGS surface while also providing a better ohmic contact for charge transport. Next, they adjust the thickness and the doping level of the hole transport layer to reduce further surface roughness and enhance the layer conductivity. The optimised perovskite/CIGS tandem solar cell delivers a certified power conversion efficiency of 22.43% on areas of 0.042 cm². Additionally, the encapsulated device retains 88% of its initial efficiency after 500 h of continuous illumination, which the researchers suggest could be due to the moisture-resistant effect of the interlayer.

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