

Flexible Perovskite Solar Cells on Ultrathin Glass: Implications of the TCO (PV-3)



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Scientific Achievement:

We obtained 18.1% power conversion efficiency from a flexible perovskite solar cell (PSC) based on ultra-thin Corning® Willow® glass. Such high efficiency is achieved by studying various transparent conductive oxides (TCOs), including tin-doped indium oxide (ITO), indium zinc oxide (IZO), and aluminum-doped zinc oxide (AZO).

Significance and Impact:

We demonstrated the importance of TCO in the formation of perovskite. The stoichiometry of the perovskite can be dramatically varied with different TCOs.

Research Details:

- Corning® Willow® Glass-based flexible PSC with 18.1% PCE.
- Both ITO and IZO were shown to be good TCO candidates for PSCs.
- Perovskite fabricated on AZO shows significant stoichiometric changes despite having a thin layer (30 nm) of SnO₂ between AZO and perovskite.

Publication(s):

B. Dou, E.M. Miller, J.A. Christians, E.M. Sanehira, T.R. Klein, F. Barnes, S.E. Shaheen, S.M. Garner, S. Ghosh, A. Mallick, D. Basak and M.F.A.M van Hest. High performance flexible perovskite solar cells on ultra-thin glass: Implications of the TCO. *The Journal of Physical Chemistry Letters* (2017). DOI: [10.1021/acs.jpcllett.7b02128](https://doi.org/10.1021/acs.jpcllett.7b02128)

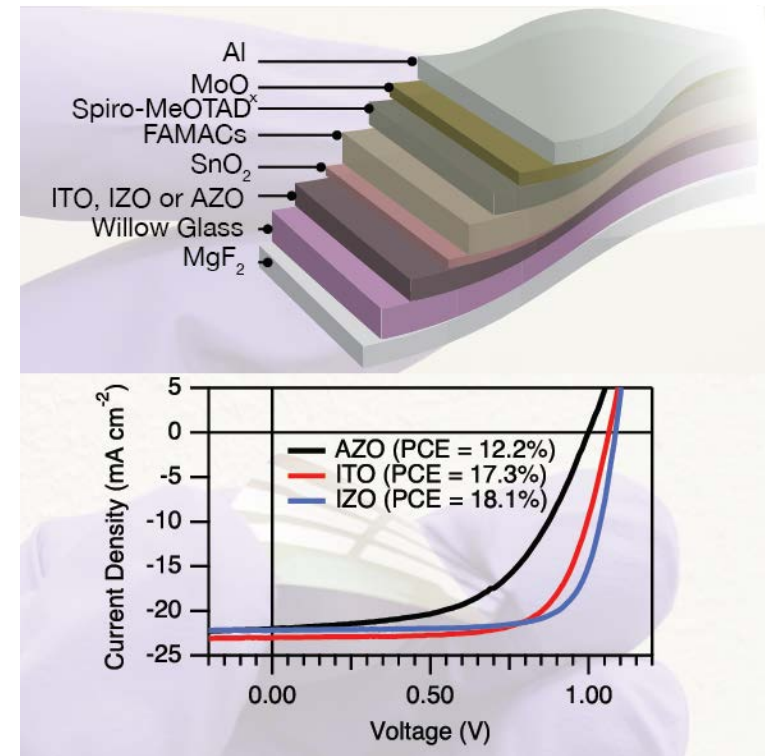


Fig. 1: Flexible perovskite solar cell. (top) structure, and (bottom) performance.

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