# The role of adding alkali to solar panels

Why do alkali metals have different energy levels?

However, because the Cu d-orbital bands were formed at the valence band maximum by adding Cu, the difference in energy levels between the alkali-metal bands and the Cu bands was approximately the same energy as that in the visible-light region. Figure 9. ( a) Changes of band structures for various alkali metals. ( b) Enlarged view at the band gap.

Do CIGS solar cells have extrinsic alkali incorporation?

To account for mechanisms of extrinsic alkali incorporation in CIGS solar cells on flexible polyimide, the alkali dopant concentrations in the film bulk (intragrain and grain boundary) and the surface chemistries/band structures were quantitatively investigated with various advanced characterization methods.

Are alkali-fluoride PDTS effective in CIGS solar cells?

Reviewing the development progress of CIGS solar cells,alkali-fluoride PDTs (including NaF,KF,RbF,and CsF) applied to CIGS absorbers have continuously produced champion efficienciesin solar devices; herein alkali treatment is always the key to efficiency breakthrough.

Can alkali metals be added to perovskite precursor solutions?

Although there have been many reportson the addition of alkali metals to perovskite precursor solutions [15,16,17,18,19,20,21,22,23 ],relatively few reported on the addition of Cu [24,25,26,27 ]. The addition of CuBr 2 and NaCl to the solutions improved the solar conversion efficiency and device durability [28,29,30 ].

What is a typical light alkali element?

Speaking of the typical light alkali elements,it is no doubt that the first representative element coming to our mind is sodium(Na) because the alkali-effect on CIGS solar cells was first realized thanks to the Na diffusion from soda lime glass (SLG) in 1993 [13 ].

Why do alkali metals have a higher JSC?

The alkali-metal energy bands formed above the conduction band minimum,which differed for the various alkali metals. Another possible reason for the increased JSC was the reduced loss of generated carriersby excitations from the Cu d-orbitals and the I p-orbitals to the s-orbitals of the alkali metals.

ficiencies. 1. Introduction Thin film CuIn0.7Ga0.3Se2 (CIGS) solar cells have reached efficiencies close to 23% [1] by using several alkali treatments. Despite these high laboratory effic encies ...

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