
Ion Diffusion and Interlayers in Perovskite Solar Cells

by *Hikmet Coskun*

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Abstract

Organic–inorganic lead halide perovskite solar cells (PSCs) have attracted significant attention recently due to their excellent photovoltaic properties, such as an extremely high optical absorption coefficient, very long carrier lifetime and tunable band gap. The power conversion efficiencies exceeding 22% are reported. However, some of the unique problems stemmed from their labile ionic structure are impeding the commercialization effort.

In this work, we propose an energy dispersive X-ray (EDX) spectrometry based method to track the diffusing anions to calculate and compare diffusion properties of different halide species in methylammonium lead halide thin films and single crystals and their relation with PSC stability. The application of tin (II) sulfide (SnS), a IV-VI semiconductor, as an interlayer material to replace bathocuproine (BCP) for electron collection interlayer is proposed to increase the stability which is further enhanced by employment of an inorganic hole transport interlayer, resulting in high efficiency and high stability PSCs with fully inorganic interlayers.

Speaker *Hikmet Coskun*

Biography

Hikmet Coskun received his Bachelor's Degree for Materials Science and Engineering from Sabanci University, Turkey in 2014. He is currently a PhD student under the supervision of A/P Ouyang Jianyong. His present research interests include facile fabrication methods of stable and high efficiency hybrid organic-inorganic perovskite solar cells.

ALL ARE WELCOME!

Prof Ding Jun Host