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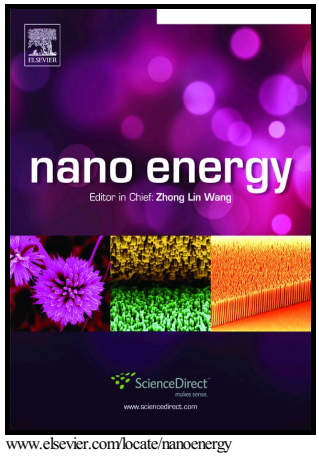


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PII: S2211-2855(18)30350-1
DOI: https://doi.org/10.1016/j.nanoen.2018.05.035
Reference: NANOEN2743

To appear in: *Nano Energy*

Received date: 29 November 2017
Revised date: 2 May 2018
Accepted date: 15 May 2018

Cite this article as: Manuel Salado, Alexander D. Jodlowski, Cristina Roldan-Carmona, Gustavo de Miguel, Samrana Kazim, Mohammad Khaja Nazeeruddin and Shahzada Ahmad, Surface passivation of perovskite layers using heterocyclic halides: Improved photovoltaic properties and intrinsic stability, *Nano Energy,* https://doi.org/10.1016/j.nanoen.2018.05.035

# Surface passivation of perovskite layers using heterocyclic halides: Improved photovoltaic properties and intrinsic stability

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Abstract

Hybrid perovskite structures have been obtained from methylammonium lead triiodide solutions doped with imidazolium iodide, which effectively passivates the surface at the perovskite/hole transporting layer (HTM) interface. By tuning the passivation layer thickness, the photovoltaic parameters, open circuit voltage ($V_{OC}$) and fill-factor (*FF*) were improved. The placement of a imidazolium iodide layer work as passivation layer on top of perovskite and retards the growth of superoxide formation. The imidazolium cation simultaneously modulates the surface texture, electrical properties, and crystallization of the perovskite films. Photoluminescence (PL) emission exhibits significant blue shift proportional to the thickness of imidazolium passivation layers confirming reduced number of surface traps, while the PL decay shows a similar trend as of pure methylammonium lead triiodide ($MAPbI_3$).

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