August 2020

Our stable Perovskite solar cells at 22.1% are published!

Two papers on our record solar cells based on $FA_{1-x}MA_xPbI_3$ perovskite are now published.

In the *Solar RRL* paper, we described a method for the best stabilization of FAPI cells using MACl additive. Especially, we have analyzed by NMR the films actually employed in devices and shown that they correspond to a x at 0.06. This result has been confirmed by photoluminescence and XRD measurements. The cells are highly stable under light shining under ambient air environment.

In the *ACS Appl. Mater. Interfaces* paper, we have investigated the role of a PEAI based layer that is produced on the $FA_{0.94}MA_{0.06}PbI_3$ perovskite layer. This treatment, without any thermal annealing, leads notably to the spontaneous formation of a crystallized $(PEA)_2PbI_4$ two-dimensional (2D) perovskite nanolayer at the film surface due to partial organic cation dissolution. This buffer layer is shown to favor a fast transfer of the holes toward the hole transporting layer (HTL) and to reduce the recombinations at and near the perovskite/HTL interface in perovskite solar cells (PSCs). It is shown to boost their maximum power conversion efficiency (PCE) from 20.37 to 22.18%. An in-depth study of the electrical response of the cells by electrical impedance spectroscopy is presented.

- The Stabilization of Formamidinium Lead Tri-Iodide Perovskite through a Methylammonium-Based Additive for High-Efficiency Solar Cells
By : Tao Zhu, Daming Zheng, Marie-Noelle Rager, Thierry Pauporté
Solar RRL, **2020**, Article Number: 2000348
DOI: 10.1002/solr.202000348

- PEAI-Based Interfacial Layer for High-Efficiency and Stable Solar Cells Based on a MACl-Mediated Grown $FA_{0.94}MA_{0.06}PbI_3$ Perovskite.
By: Tao Zhu, Daming Zheng, Jiawen Liu, Laurent Coolen, and Thierry Pauporté,
ACS Appl. Mater. Interfaces **2020**, *12*, 37197–37207
DOI: 10.1021/acsami.0c09970