

Accepted Manuscript

Influence of air degradation on morphology, crystal size and mechanical hardness of perovskite film

Abdullah Al Mamun, Yousuf Mohammed, Tanzila Tasnim Ava, Gon Namkoong, Abdelmageed A. Elmustafa

PII: S0167-577X(18)31031-0
DOI: <https://doi.org/10.1016/j.matlet.2018.06.126>
Reference: MLBLUE 24566

To appear in: *Materials Letters*

Received Date: 11 April 2018
Revised Date: 21 June 2018
Accepted Date: 30 June 2018

Please cite this article as: A.A. Mamun, Y. Mohammed, T.T. Ava, G. Namkoong, A.A. Elmustafa, Influence of air degradation on morphology, crystal size and mechanical hardness of perovskite film, *Materials Letters* (2018), doi: <https://doi.org/10.1016/j.matlet.2018.06.126>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



**Influence of air degradation on morphology, crystal size and mechanical hardness of
perovskite film**

Abdullah Al Mamun¹, Yousuf Mohammed², Tanzila Tasnim Ava¹, Gon Namkoong^{*1},
Abdelmageed A. Elmustafa²

¹Department of Electrical and Computer Engineering, Old Dominion University, Applied
Research Center, 12050 Jefferson Ave, Newport News, VA 23606, USA

² Mechanical and Aerospace Engineering, Old Dominion University, Applied Research Center,
12050 Jefferson Ave, Newport News, VA 23606, USA

*Corresponding author: Gon Namkoong (gnamkoon@odu.edu)

Abstract

Hybrid halide perovskite is attracting attention as an alternative solar cell material, but the air instability of perovskite is still a major research problem. The current work investigates how air degradation affects the crystal size, surface morphology, and mechanical hardness of the perovskite. Interestingly, we found that the crystal sizes of perovskite, PbI_2 and I_2 extracted from XRD measurements exhibited a dynamic variation with exposure to air. Particularly, it was found that the elastic modulus and hardness of the perovskite films increased for a 20 hr exposure to air and then gradually decreased due to chemical decomposition and formation of pinholes in the perovskite film.

Keywords: perovskites; degradation; elastic modulus; hardness; crystal size

Download English Version:

<https://daneshyari.com/en/article/8012462>

Download Persian Version:

<https://daneshyari.com/article/8012462>

[Daneshyari.com](https://daneshyari.com)