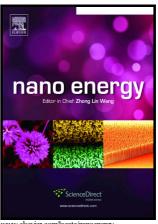
# Author's Accepted Manuscript

**High-Performance** Pseudo-halide Perovskite Nanowire Networks for Stable and Fast-response Photodetector

Ivy M. Asuo, Dawit Gedamu, Ibrahima Ka, Luis Felipe Gerlein, François-Xavier Fortier, Alain Pignolet, Sylvain G. Cloutier, Riad Nechache



www.elsevier.com/locate/nanoenergy

PII: S2211-2855(18)30451-8

https://doi.org/10.1016/j.nanoen.2018.06.057 DOI:

Reference: NANOEN2838

To appear in: Nano Energy

Received date: 26 March 2018 Revised date: 16 June 2018 Accepted date: 16 June 2018

Cite this article as: Ivy M. Asuo, Dawit Gedamu, Ibrahima Ka, Luis Felipe Gerlein, François-Xavier Fortier, Alain Pignolet, Sylvain G. Cloutier and Riad Nechache, High-Performance Pseudo-halide Perovskite Nanowire Networks for and Fast-response Photodetector, Nano Energy, https://doi.org/10.1016/j.nanoen.2018.06.057

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## **ACCEPTED MANUSCRIPT**

## High-Performance Pseudo-halide Perovskite Nanowire Networks for Stable and Fastresponse Photodetector

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#### **ABSTRACT**

Perovskite-based photodetectors show a great promise thanks to the material's excellent photogeneration and broadband device operation. Amongst the fundamental limitations of halide perovskites, humidity-induced degradation arises as the main impediment towards viable commercial-grade perovskite-based technologies. Here, we report a stable, reproducible and reliable pseudo halide perovskite nanowire network-based photodetector with superior performances. The perovskite nanowire network is deposited using a two-step spin-coating process atop patterned substrates under ambient conditions with relative humidity (RH%), higher than 50 %. Because of the particular 1D perovskite nanowire morphology, our devices require no charge collectors, which reduces fabrication steps and costs. Most importantly, we demonstrate that incorporation of lead thiocyanate (Pb(SCN)<sub>2</sub>) directly in the precursor solution promotes the synthesis of stable hybrid perovskite nanowire networks in ambient conditions. These devices exhibit response time as fast as 50 μs and responsivities up-to ~0.23 A.W<sup>-1</sup> at 2 V bias. Also, the optimum photodetector exhibited high specific detectivity of 7.1 x 10<sup>11</sup> cm.Hz<sup>1/2</sup>.W<sup>-1</sup>. This novel and yet simple device architecture

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<sup>&</sup>lt;sup>1</sup> I. M. Asuo and D. Gedamu contributed equally to this work.

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