

SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COLLEGE OF DESIGN AND ENGINEERING

Website: <https://cde.nus.edu.sg/ece>

Area: Microelectronic Technologies & Devices, and Solar Cell Technology

Host: Professor Aberle, Armin Gerhard

TOPIC	:	Potential Induced Degradation in Perovskite Solar Cells
SPEAKER	:	Ms Laxmi Nakka Graduate Student, ECE Dept, NUS
DATE	:	Thursday, 1 December 2022
TIME	:	9.00AM to 9.30AM
VENUE	:	Join Zoom Meeting https://nus-sg.zoom.us/j/86707454731?pwd=L3FjZTFuNVFpbmdJSkFvWjBvQ2Rqdz09 Meeting ID: 867 0745 4731 Passcode: 900798

ABSTRACT

Potential induced degradation (PID) occurs due to high electric potential difference in a fielded photovoltaic (PV) module between the solar cell front surfaces and the grounded module frame. It is one of the major reliability concerns that affects the lifetime of fielded PV modules. This talk presents the first detailed investigation of the effects of PID in encapsulated perovskite PV modules under standard room-temperature conditions as well as damp-heat test conditions, following the standard foil test method. After 55 hours of operation, the devices with negatively biased PID suffer significant and rapid degradation under both test conditions. Application of reverse (positive) bias for 90 h to the effected devices under standard test conditions resulted in a recovery from 39.6% to 61.7% of the initial PV efficiency. However, the performance improved from 10.35% to only 20.25% of the initial PV efficiency under damp-heat conditions. Various characterizations are performed in this work to illustrate the underlying degradation mechanism. The results reveal that reversing the polarity alone is not a sufficient condition to recover the PID under damp heat conditions. This work therefore opens several questions for future investigations on this new and unexplored avenue. The outcome of this work is of high interest to the perovskite solar community for successful realization of long-term stable and large-scale perovskite-based photovoltaics.

BIOGRAPHY

Laxmi NAKKA is a PhD student at NUS-ECE. She is conducting her research at the Solar Energy Research Institute of Singapore (SERIS) at NUS. She received her Bachelor's and Master's degree from the Indian Institute of Information Technology Design and Manufacturing Madras, India. Her research interests include fabrication & characterization of thin films, perovskite solar cells, and emerging PV technologies.

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