

SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
FACULTY OF ENGINEERING

Website: <https://www.eng.nus.edu.sg/ece/>

Area: Microelectronic Technologies & Devices, and Solar Cell Technology

Host: Prof. Armin ABERLE (ECE & SERIS)

TOPIC	:	Towards Highly Efficient Spiro-OMeTAD Based Perovskite Solar Cells
SPEAKER	:	Ms Laxmi NAKKA Graduate Student, ECE, NUS
DATE	:	Wednesday, 20 October 2021
TIME	:	2.00PM to 3.00PM
WEBINAR	:	Join Zoom Meeting https://nus-sg.zoom.us/j/87191525576?pwd=RHpTcTJ1cU9HTjMxR3l4UENPdC9mdz09 Meeting ID: 871 9152 5576 Passcode: 605801

ABSTRACT

Organic-inorganic metal halide perovskite solar cells (PSCs) have experienced a very rapid development in recent years, with laboratory device efficiencies improving from 3.8% in 2009 to an impressive 25.5% in 2020. Thus, PSCs are currently considered a very promising new photovoltaic (PV) technology due to their excellent optoelectronic properties such as high optical absorption coefficient, long charge carrier lifetime and low non-radiative recombination rates. One of the important factors for achieving highly efficient PSCs is the proper choice of the hole transport material (HTM). Spiro-OMeTAD ("spiro") is the most widely used HTM for PSCs. As the pristine Spiro offers poor hole mobility, it is usually doped with LiTFSI salts and tBP which require overnight oxidation for enhancing the hole extraction. However, doping with LiTFSI makes the film hygroscopic and affects the stability of the PSCs. To address this issue, spiro can also be doped with FK209 Co (III) salts which facilitate immediate oxidation. It is found that researchers expose Co (III) doped spiro in air for different durations. The reasons for overnight oxidation have not been addressed by the researchers and this is yet to be investigated.

In this seminar, we propose that Co (III) doped spiro does not necessarily require any additional oxidation. We fabricated PSCs using LiTFSI doped spiro, FK209 Co (III) doped spiro and compared the performance of the devices with and without oxidation via advanced characterizations. From the J-V characteristics, it is verified that there is insignificant change in the efficiency of PSCs based on FK209 Co (III) doped spiro, irrespective of the oxidation time. In addition, photoluminescence results confirmed the superior performance of PSCs with FK209 Co (III) doped spiro without oxidation. A detailed overview on the progress of spiro based PSCs will also be presented in this seminar.

BIOGRAPHY

Laxmi NAKKA is a research scholar at ECE and the Solar Energy Research Institute of Singapore (SERIS), NUS. She has received her Bachelor's and Master's degrees from the Indian Institute of Information Technology, Design and Manufacturing, in Madras, India in 2019. Her research interests include fabrication & characterization of thin films, perovskite solar cells, and emerging PV technologies.

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