Subject: M.Tech. Project Presentation by Lokesh Mahlawat 29th Thu. 4 PM

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Date: 2021-07-28 23:20
Priority: Normal

Zoom link: https://iitk-ac-in.zoom.us/j/93752229256?pwd=RFQvbDV4bGZuVjR6anFwZm42c11ZQT09
Meeting ID: 937 5222 9256
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Dear Colleagues,

Mr. Lokesh Mahlawat, Roll no. 16887367, BT-MT student from Electrical Engineering Department will be presenting his M.Tech. Project Report in an on-line seminar. The details are as given below.

Topic: "Study of the S-kink in J-V curves due to the presence of energy barriers and mobility imbalance in a P3HT:PCBM organic solar cell"

Date: 29th July, 2021 (Thursday)
Time: 4 PM
The zoom link for the presentation is given above.

Abstract of the M.Tech. project

Organic solar cells have the potential to be cost-effective power sources. But in terms of efficiency, they are still lagging behind their inorganic counterparts. Sometimes an S-shaped kink in the device J-V curve under illumination is encountered. And due to this S-kink, the fill factor and hence the efficiency of the cells are reduced even further.

This work attempts to study the S-kink present in the J-V curves of P3HT:PCBM based BHJ organic solar cells with the help of simulations. Two different aspects of the J-V characteristics were studied using a couple of reasons for the presence of the S-kink. The aspects that were used to study the S-kink are the voltage at the inflection point normalized with Voc and the maximum and minimum values of the curvature or second derivative of the J-V characteristics close to the inflection point.

Firstly, the devices were simulated by varying the energy barriers (0.0 to 0.8 eV) at both contacts. We found that with a change in the energy barriers there is change in the location of the inflection point, but the curvature remains the same. Secondly, the devices were simulated by varying the mobility ratio μn/μp from 8.001 to 10000. We found that the changes in the mobility ratio does not change the normalized voltage at the inflection point whereas the magnitude of curvature increases for some time and then starts to saturate for higher mobility values.

All interested are welcome to join the presentation.

With regards
S. Sundar Kumar Iyer
Thesis Advisor

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