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POS-51 - Light-soaking effects on Organic Semiconductor-based diodes

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Organic semiconductors are quite promising for the field of photovoltaics, light-emitting diodes, flexible electronics and biosensors/electronics. However, poor charge mobility that comes along with their amorphous nature, and/or their susceptibility to photodegradation especially in the presence of oxygen and moisture, and poor repeatability of characteristics have been some of the common issues which yet need better understanding. While there is an ongoing research on improving the stability by modifying the polymer structure and morphology of the film formation, it is also critical to identify the spatial and energetic location of defects in these materials in order to mitigate them. In this work, we probe the defects by soaking the devices based on two conjugate polymers, P3HT and MDMO:PPV, under UV-visible light using simple current-voltage characteristics, charge extraction technique like CELIV and luminescence studies. A common observation to all the devices that indicate a reduced charge extraction and enhanced electroluminescence efficiency will be given a physical interpretation of the location of the defects in them. The tests were performed on the (un)encapsulated devices and probed at microscopic scale using optical microscope. A comparative tests on the encapsulated and unencapsulated devices helped identify the effects of intrinsic and extrinsic defects on the polymers based devices.

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