

Reliability of semitransparent organic photovoltaics

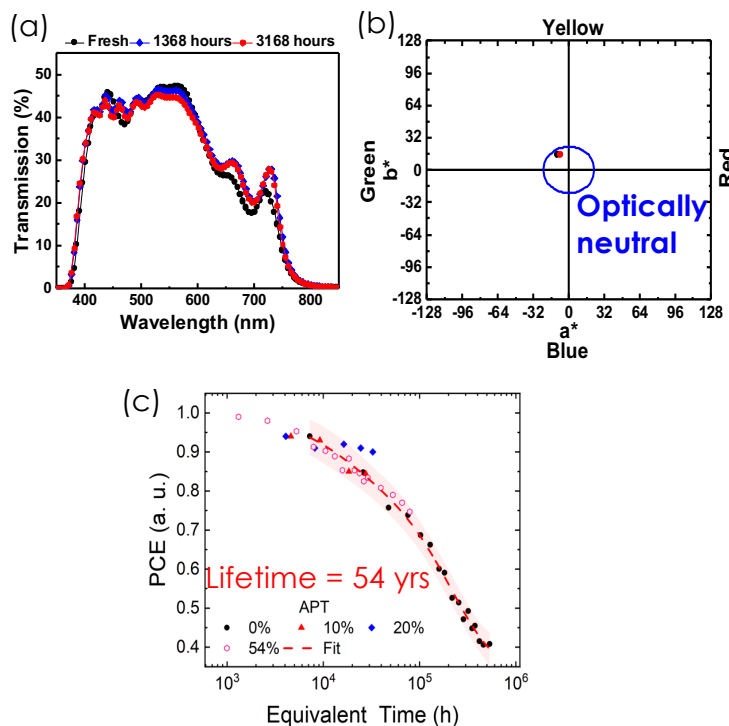


Figure: (a) Time evolution of transmittance of the ST-OPV under 1 sun illumination. (b) Fresh (black dot) and aged (red dot) color points of the device in CIELAB space. (c) Extrapolated lifetime of the ST-OPV along the time axis of the opaque device. The device with APT = 54 % has an extrapolated time of 54 years.

Objective

- To study and improve the reliability of semi-transparent organic photovoltaics

Impact

Replacing passive glass pane windows with semitransparent OPVs (ST-OPVs) will enable onsite energy generation for buildings and significantly reduce emission. For this to be achieved, ST-OPVs must be reliable. The intrinsic reliability of small molecule as well as non-fullerene acceptor based organic photovoltaics has been demonstrated. This suggests that ST-OPVs consisting of similar active layers must also be stable. This project explores the engineering and physics of the reliability of these devices.

Facilities and Methods Used

- Vacuum thermal evaporator
- E-beam deposition chamber
- Spin coater
- Magnetron Sputterer
- UV/VIS/NIR spectrophotometer
- Ellipsometer
- 1 Sun, high solar intensities, and thermal reliability test stations

Relevant Papers

- H. K. M. Sheriff, Jr., et Al., Device, DOI: 10.1016/j.device.2024.100369

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