

2026 HBCU CHIPS Network Conference

Contribution ID: 45

Type: ORAL

Assessment of optoelectronic properties of an ambipolar polymer –photochromic dye blend in the solid state for organic photoresponsive device applications.

Wednesday, April 1, 2026 1:30 PM (20 minutes)

Research in polymer semiconductors drives the race to efficient flexible electronics, synaptic transistors and polymer solar cells. The current study investigated the fundamental optoelectronic properties of a donor – acceptor polymer blend, incorporated with a photochromic dye in the solid state, with the view to optimize the material's parameters for organic photoresponsive device applications. It is a work in progress that is built on the premise that (i) a donor –acceptor blend might present a better charge transfer than a single polymer and (ii) a photochromic dye could potentially control charge transport via isomerization. A blend of Poly- 3-Hexylthiophene (P3HT), Poly naphthalene bithiophene (N2200) and Spiropyran dye was used as a case study, where a 1:1 weight ratio was maintained for all samples studied. Optoelectronic properties were extracted through UV –Vis spectral analysis and in the frames of Spitzer- Fan and Wemple-DiDomenico models. Results showed significant changes in properties such as bandgap and charge density of the blend compared to pristine P3HT and N2200 samples.

Academic or Professional Status

Faculty

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Session Classification: Technical Session 1

Track Classification: Materials & Devices: Materials & Devices - (a)