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Band structure and device fabrication using thin-films of p-benzoquinonemonoimine zwitterion/P3HT blends GERSON DIAZ, FREDDY WONG, EDUARDO VEGA, LUIS ROSA, Univ. of Puerto Rico- Humacao, LUCIE ROUTABOUL, PIERRE BRAUNSTEIN COLLABORATION[1] — Most organic materials are insulators or semiconductors and few explicitly exhibit a density of states at the Fermi level. Stable charge neutral organic molecules do not usually behave as metals because the interatomic hybridization causes the conduction and valence bands to be completely unfilled and filled, respectively. The electronic structure of the p-benzoquinonemonoimine zwitterion molecular film has a definite, although small, density of states evident at the Fermi level as well as a nonzero inner potential and thus is very different from a true insulator. Using this newly discover property of the zwitterion we are using blends of Poly(3-hexylthiophene) or P3HT/zwitterion for device fabrication and characterization. P3Ht is a semiconducting polymer with high electron mobility, a promising characteristic in organic semi-conductive devices. Photoelectron emission and inverse photoemission spectroscopy studies of polymer blends of p-benzoquinonemonoimine zwitterion and regio-regular poly(3-hexylthiophene) (P3HT) thin-films provide evidence of changes in the molecular band structure. Electric measurements done with these polymer blends show evidence of higher transport currents in comparison to P3HT polymer thin-films alone.

[1]Laboratoire de Chimie de Coordination, Institut de Chimie (UMR 7177 CNRS), Université de Strasbourg, France

Gerson Diaz
Univ. of Puerto Rico- Humacao

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