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Interfacial Electronic Structures for Electron and Hole Injection in Organic Devices: Nanometer Layers of CsN3 and 1,4,5,8,-naphthalene-tetracarboxylic-dianhydride (NTCDA)

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The electron/hole injections in organic electronic devices have long been an issue due to the large energy level mismatches between electrode and organic layer. To utilize the organic materials in electronic devices, functional thin layers have been used, which reduce the electron/hole injection barrier from electrode to organic material. Typically, inorganic compounds and organic molecules are used as an electron and hole injection layer, respectively. Recently, CsN3 and 1,4,5,8,- naphthalene-tetracarboxylic-dianhydride (NTCDA) are reported as a potential electron and hole injection layers. CsN3 shows unique properties that it breaks into Cs and N and thus Cs can dope organic layer into n-type. On the other side, hole injection anode, NTCDA forms gap states with anode material. In this presentation, we show the electronic structure changes upon the insertion of CsN3 and NTCDA at proper interfaces to reduce the charge injection barriers. These barrier reductions are correlated with device characteristics.

Keywords: electronic structure, organic device, interface, CsN3, NTCDA