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Electronic structure of MoO3 insertion layer at the interface between organic semiconductor and indium tin oxide (ITO). HUANJUN DING, IRFAN IRFAN, Department of Physics and Astronomy, University of Rochester, YONGLI GAO, university of rochester, FRANK SO, Department of Materials Science and Engineering, University of Florida — We have investigated the electronic structure of the interfaces formed by inserting thin layer of MoO_3 in between indium tin oxide (ITO) and different organic semiconductors, such as aluminium phthalocyanine chloride (AlPcCl) and copper phthalocyanine (CuPc), with photoemission and inverse photoemission spectroscopy (PES and IPES). The presents of MoO_3 layer at the interface increases the workfunction dramatically. As a result, the organic HOMO is almost aligned with the Fermi level (E_f) at the AlPc-Cl/MoO_3 interface. For thicker AlPc-Cl layers, gradual band bending is observed. However, the recovery of the HOMO is incomplete for AlPc-Cl thickness of 200 Å, leading to a great reduction of the hole injection barrier compare to the case without MoO_3. Similar situation is found in case of CuPc/MoO_3, although the energy levels are almost fully recovered for CuPc film thicker than 200 Å. The energy level alignment of these interfaces will be discussed to explain the improvement induced by MoO_3 layer in device performance.

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