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Work function recovery of air exposed molybdenum oxide thin films with vacuum annealing IRFAN IRFAN, University of Rochester, ALEXANDER TURNISKE, University of Wisconsin, ZHENAN BAO, Stanford University, YONGLI GAO, University of Rochester — We report substantial work function (WF) recovery of air exposed molybdenum oxide thin films with vacuum annealing. The high WF (∼6.8 eV) of thermally evaporated MoO_x thin film was observed to decrease sharply to ∼5.6 eV with an air exposure of one hour. The drop in the WF was accompanied with a very thin layer of oxygen rich adsorbate on the MoO_x film. The WF of the exposed MoO_x film started to gradually recover with increasing annealing temperature in a vacuum chamber having base pressure of 8 x 10^{-11} torr. The saturation in the WF recovery was observed around 460 °C, with WF ∼6.4 eV. The adsorb layer was found to be removed after the vacuum annealing. We further studied the interface formation between the annealed MoO_x and copper pthalocynine (CuPc). The highest occupied molecular orbital (HOMO) level of CuPc was observed to be almost pinned to the Fermi level, strongly suggesting an efficient hole injection through the vacuum annealed MoO_x film.

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