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**Evolution of the Unoccupied States in Alikali metal doped Copper-Phthalocyanine** HUANJUN DING, KIWAN PARK, YONGLI GAO, University of Rochester — The evolution of both the occupied and unoccupied states for Cs and Na-doped Copper-Phthalocyanine (CuPc) has been investigated with photoemission and inverse photoemission spectroscopy (IPES). From the IPES measurement, it is observed that, as the alkali metal doping ratio increases, the lowest unoccupied molecular orbital (LUMO) of CuPc shifts toward the Fermi level, and the shift becomes saturated when the LUMO edge is aligned with the Fermi level. After the saturation, the LUMO intensity decreases monotonically, while a gap state grows in the valence spectra. The evolution of the LUMO gives direct evidence for the origin of the doping-induced gap state in CuPc molecules. The intensity of the LUMO, as well as the gap state, for high Cs doping ratios clearly suggests that multiply charged CuPc species are formed in the doped film.

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