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Manipulating the dipole layer of polar organic molecules on metal surfaces via different charge-transfer channels MENG-KAI LIN, Natl Tsing Hua Univ, YASUO NAKAYAMA, Department of Pure and Applied Chemistry, Tokyo University of Science, YING-JIE ZHUANG, CHIN-YUNG WANG, Natl Tsing Hua Univ, TUN-WEN PI, National Synchrotron Radiation Research Center (NSRRC), HISAO ISHII, Graduate School of Advanced Integration Science, Chiba University, S.-J. TANG, Natl Tsing Hua Univ — The key properties of organic films such as energy level alignment (ELA), work functions, and injection barriers are closely linked to this dipole layer. Using angle resolved photoemission spectroscopy (ARPES), we systemically investigate the coverage-dependent work functions and spectra line shapes of occupied molecular orbital states of a polar molecule, chloroaluminium phthalocyanine (ClAlPc), grown on Ag(111) to show that the orientations of the first ClAlPc layer can be manipulated via the molecule deposition rate and post annealing, causing ELA at organic-metal interface to differ for about 0.3 eV between Cl-up and Cl-down configuration. Moreover, by comparing the experimental results with the calculations based on both gas-phase model and realistic model of ClAlPc on Ag(111), we evidence that the different orientations of ClAlPc dipole layers lead to different charge-transfer channels between ClAlPc and Ag, a key factor that controls the ELA at organic-metal interface.

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