Abstract Submitted
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Doping Dependent Electronic Structure of KxC60 Monolayers Studied by Angle Resolved Photoemission[1] W.L. YANG, V. BROUET, X.J. ZHOU, Department of Physics, Applied Physics, Stanford Synchrotron Radiation Lab, Stanford University; Advanced Light Source, Lawrence Berkeley National Lab, Z. HUSSAIN, Advanced Light Source, Lawrence Berkeley National Laboratory, Berkeley, CA 94720, Z.-X. SHEN, Department of Physics, Department of Applied Physics and Stanford Synchrotron Radiation Laboratory, Stanford University, Stanford, CA 94305 — KxC60 (1<x<6) shows complicated but interesting phase transitions between insulators and metals, in contrast to a rigid band picture where the system always has a partially filled conduction band. The study on the novel doping behavior is thus of great interest but seriously intervened by lattice structure for bulk materials. Through angle resolved photoelectron spectroscopy, we were able to study systematically the electronic structure evolution of KxC60 monolayers which does not show bulk-like lattice structure change. Unexpectedly, our data strongly suggest the existence of phase separation between K3C60 and K4C60 in monolayers, accompanied by metal-insulator transition. We also reveal that the electron-phonon coupling manifests itself in different ways for the metallic and insulating phases. Further, the long standing problem on the shifting insulating peak with doping could be expected by a polaronic scenario for insulating phases.

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