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Enhanced Electron Interactions on Hydrogen Adsorbed ZnO Surface RYU YUKAWA, Institute for Solid State Physics, University of Tokyo, KENICHI OZAWA, Department Of Chemistry and Materials Science, Tokyo Institute of Technology , SUSUMU YAMAMOTO, Institute for Solid State Physics, University of Tokyo, HIDEAKI IWASAWA, JIAN JIANG, Hiroshima Synchrotron Radiation Center, Hiroshima University, HIROKAZU HAYASHI, TAIKI HORIKE, YORITO NAGATA, Graduate School of Science, Hiroshima University, KENYA SHIMADA, HIROFUMI NAMATAME, Hiroshima Synchrotron Radiation Center, Hiroshima University, MASAKI TANIGUCHI, Hiroshima Synchrotron Radiation Center, Hiroshima University, Graduate School of Science, Hiroshima University, IWAO MATSUDA, Institute for Solid State Physics, University of Tokyo — Zinc oxide (ZnO) is a wide band- gap semiconductor (3.37 eV), and is widely used as a catalyst, a chemical sensor, and a variety of electronic and photonic devices. Recent studies have revealed that a two-dimensional electron gas (2DEG) is formed on a hydrogen adsorbed ZnO($10\bar{1}0$) surface. However, a precise structure of the 2DEG on a ZnO surface is still uncertain. We have investigated the electronic states using angle-resolved photoemission spectroscopy (ARPES), and found the clear incoherent states associated with the coherent metallic peaks near the Fermi-level, giving direct evidence of many-body interactions inherent to 2D metallic states. The incoherent states are enhanced by the hydrogen adsorptions. Thus, we suggest that the incoherent peaks are originated from electron-phonon and electron-electrons interactions enhanced by the electron doping on the surface.

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