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Structure and Electronic Properties of Single- to Few Layers Molybdenum Disulfide Films[1] D. TRAINER, A. PUTILOV, M. WOLAK, R. U. CHANDRASENA, Department of Physics, Temple University, Philadelphia, PA 19122, F. KRONAST, Helmholtz-Zentrum Berlin fr Materialien und Energie GmbH, D-12489 Berlin, Germany, A. X. GRAY, X. X. XI, M. IAVARONE, Department of Physics, Temple University, Philadelphia, PA 19122 — Using high resolution scanning tunneling microscopy and spectroscopy (STM/STS) we have investigated the electronic properties of mono- to few layers molybdenum disulfide films grown on HOPG using ambient pressure chemical vapor deposition (APCVD). Atomic force microscopy and STM show that this growth technique produces crystalline triangular and hexagonal islands with varying thicknesses in 1ML increments. The films exhibited a suppression of quasiparticle band-gap as a function of layer number as measured by local spectroscopy. Changes in the valence band edge were supported by photoemission electron microscopy (PEEM) measurements. We also report on a strain-induced contraction of the quasiparticle band-gap in proximity to grain boundaries and defects.

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