

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Scanning Tunneling Microscopy Study of Grain Boundaries in Graphene Grown by Chemical Vapor Deposition on Copper Foil JUSTIN KOEPKE, DAVID ESTRADA, JOSHUA WOOD, ERIC POP, JOSEPH LYDING, University of Illinois at Urbana-Champaign — There have been few scanning tunneling microscopy studies of graphene grown by CVD on Cu [1] and no atomic scale studies of the electronic properties of the films' grain boundaries. We present the electronic nature of grain boundaries in polycrystalline graphene grown by CVD on Cu foil and transferred to SiO₂ substrates. These grain boundaries are continuous across large protrusions and wrinkles in the graphene and other surface topography. We observe misorientation angles of approximately 7°, 23°, and 30° across the grain boundaries and standing wave patterns adjacent to the grain boundaries with a decay length on the order of 1 nm. The spectroscopy shows enhanced conduction in empty states at the grain boundaries. The graphene is grown on 1.4 mil copper foil by CVD. After growth the graphene was transferred onto a SiO₂/Si substrate using PMMA and FeCl₃. Raman spectroscopy and atomic force microscopy are used to characterize the roughness and quality of the graphene. The sample was degassed in the UHV-STM system at 600 – 700 °C for 24 hours.

[1] X. Li et al., Science 324, 1312 (2009)

Justin Koepke
University of Illinois at Urbana-Champaign

Date submitted: 29 Dec 2010

Electronic form version 1.4