Abstract Submitted
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Characterization of strain in CVD graphene on copper substrates[1] RUI HE, University of Northern Iowa, LIUYAN ZHAO, NICHOLAS PETRONE, Columbia University, MICHAEL ROTH, University of Northern Iowa, JAMES HONE, PHILIP KIM, ABHAY PASUPATHY, ARON PINCZUK, Columbia University — Strain plays an important role in controlling graphene's properties and induces significant changes in the electronic band structure. Strain and morphology of CVD (chemical vapor deposition) graphene layers grown on Cu substrates are studied by Raman spectroscopy and scanning tunneling microscopy (STM). We find that CVD graphene on Cu surfaces are subject to strain which depends on the orientation of the underlying Cu surfaces. The strain is compressive on Cu (111) surface and estimated to be on the order of 0.5 percent by molecular dynamics (MD) simulations. For graphene grown on Cu (100) surface the strain is highly nonuniform and includes both compressive and tensile components. MD simulations of graphene on Cu (100) show highly nonuniform strain patterns including linear superstructures, consistent with the patterns seen in STM. For graphene grown on Cu foil the strain is partially released after graphene is removed from Cu surfaces and transferred onto oxidized Si substrate.

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