

Abstract Submitted  
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**Physisorption strain in CVD graphene on copper substrates<sup>1</sup>** RUI HE, Univ of Northern Iowa, LIUYAN ZHAO, NICHOLAS PETRONE, Columbia Univ, MICHAEL ROTH, Univ of Northern Iowa, JAMES HONE, PHILIP KIM, ABHAY PASUPATHY, ARON PINCZUK, Columbia Univ — 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. For graphene grown on Cu (100) surface, the strain is highly nonuniform and includes both compressive and tensile components. Molecular dynamics (MD) simulations show that the compressive strain in graphene on Cu (111) is on the order of 0.5 percent expressed through the presence of hexagonal superstructures and highly compressed domain walls. 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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