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Scanning Tunneling Microscopy Study of Fluorinated Graphene on Copper SCOTT SCHMUCKER, JOSHUA WOOD, RICK HAASCH, JOSEPH LYDING, University of Illinois at Urbana-Champaign — We probe by ultrahigh vacuum scanning tunneling microscopy (UHV-STM) the structural and electronic properties of monolayer fluorinated graphene (C_xF , $x \approx 4$) synthesized by chemical vapor deposition on copper substrates and fluorinated by xenon difluoride gas [1]. The chemical composition and structure of the resulting film is probed by x-ray photoelectron spectroscopy (XPS), Raman spectroscopy, and scanning tunneling spectroscopy (STS). In contrast to metallic graphene, this material exhibits a large (>3 eV) band gap with a muted gap state corresponding to a copper surface state near -0.4 eV. We further investigate by STM alignment between the fluorographenic surface layer and copper substrate, uniformity of fluorination, and stability of fluorinated graphene under electron bombardment and thermal annealing.

[1] J.T. Robinson, et al., Nano Lett. 10, 3001-2005 (2010)

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