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Atomic-scale scanning tunneling microscopy and spectroscopy studies of nanometer-sized graphene on the Si(111)-7x7 surface. JUSTIN KOEPKE, JOSEPH LYDING, University of Illinois at Urbana-Champaign — We have used ultrahigh vacuum scanning tunneling microscopy to perform atomic-level studies of graphene on the Si(111)-7x7 surface. We used a dry contact transfer technique (DCT) developed by Albrecht and Lyding [1] to deposit mechanically exfoliated graphene in-situ [2] onto atomically clean Si(111)-7x7 surfaces. The DCT method deposits single, double, and thicker layers of atomically clean graphene. We observe varying degrees of transparency of the graphene monolayers and bilayers on the Si(111)-7x7 surface, where the substrate atomic structure is clearly seen through the graphene. We believe that the electronic structure of a graphene monolayer on the Si(111)-7x7 surface leads to the transparency of monolayers and bilayers, similar to the findings of Rutter, et al [3]. Room-temperature scanning tunneling spectroscopy (STS) measurements of the graphene monolayers and bilayers on the Si(111)-7x7 surface show predominantly metallic behavior. [1] P.M. Albrecht and J.W. Lyding, Appl. Phys. Lett. 83, 5029 (2003) [2] K.A. Ritter and J.W. Lyding, Nanotechnology 19, 015704 (2008) [3] G.M. Rutter, et al, Phys. Rev. B 76, 235416 (2007)

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