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Atomic-scale studies of nanometer-sized graphene on semiconducting surfaces. JUSTIN KOEPKE, KYLE RITTER, KEVIN HE, JOSEPH LYDING, Univ of Illinois - Urbana — We have performed atomic level studies of graphene on semiconducting surfaces using ultrahigh vacuum scanning tunneling microscopy (UHV-STM) [1]. By mechanically exfoliating graphite and using an in-situ dry contact transfer technique [2], we observe predominantly single and double layers of atomically clean graphene with lateral dimensions of 2-20 nm. Room temperature scanning tunneling spectroscopy measurements of the 2-10 nm monolayer pieces display a size-dependent energy gap ranging from 0.1-1 eV, while monolayers with lateral dimensions of 20 nm exhibit a finite density of states at the Fermi level. [1] K.A. Ritter and J.W. Lyding, Nanotechnology, in press (http://arxiv.org/pdf/0711.0050). [2] P.M. Albrecht and J.W. Lyding, APL 83, 5029 (2003).

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