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Structural and Electronic Properties of Bilayer Epitaxial Graphene GREGORY M. RUTTER, PHILLIP N. FIRST, Georgia Institute of Technology, Atlanta, GA, JASON N. CRAIN, JOSEPH A. STROSCIO, Center for Nanoscale Science and Technology, NIST, Gaithersburg, MD — Scanning tunneling microscopy (STM) and spectroscopy (STS) are used to study the structural and electronic properties of epitaxial graphene on SiC(0001) [1]. We address in this talk the surface morphology and stacking sequence of bilayer graphene. STM topographic images show that in the initial stages of growth, the surface morphology of graphene conforms to an underlying SiC interface reconstruction [1]. In bilayer epitaxial graphene, the top graphene layer forms a continuous sheet across steps separating adjoining terraces. A change in the apparent height between the two graphene basis atoms is observed as a function of tunneling bias. We model the relative heights based on a simple form for the local density of states in AB layer stacking (Bernal, as typical for bulk graphite) [2], and predict a smooth transition from imaging a single sublattice to imaging both sublattices. The experimentally-observed transition is consistent with Bernal stacking of the epitaxial bilayer, and an interlayer hopping energy of 0.4 eV. This work was supported in part by NSF grant ECS-0404084 and Dept. of Commerce/NIST grant 60NANB7D6166. [1] G. M. Rutter et al., Science **317,** 219 (2007); arXiv:0711.2523. [2] Z. F. Wang et al., Phys. Rev. B **75,** 085424 (2007).

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