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Structural Differences Between Graphite Grown on Si- and C-Terminated Polar Faces of 4H-SiC[1] JOANNA HASS, RUI FENG, XUEBIN LI, MICHAEL SPRINKLE, Georgia Institute of Technology, CLAIRE BERGER, CNRS-LEPES, EDWARD CONRAD, Georgia Institute of Technology — In the last two years the transport properties of 2D graphene grown on SiC have shown that electron coherence lengths can exceed many microns. It is now critical to understand the source of these unique transport properties and explain their dependence on which polar face they are grown. We will present surface X-ray diffraction data that highlights the structural differences between graphite grown on C-terminated and Si-terminated 4H-SiC. We will show that the C-terminated graphite grows in domains more than an order of magnitude larger than the Si-terminated graphite.[1] Strain, islanding and complex rotational phases in the graphene will be presented. More importantly, X-ray reflectivity measurements reveal a tightly bound initial graphene layer, with a second graphene layer at an interlayer spacing significantly larger than in the bulk. The implications of this "buffer" layer will be discussed in terms of recent band structure calculations[2] and a possible explanation for transport seemingly being confined to a single graphene layer. [1] J. Hass, et al., App. Phys. Lett. **89**, 143106 (2006). [2] F. Varchon, et al., (to be published).

[1]NSF, Intel Corp.

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