

Abstract Submitted
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In situ observation of the graphene domain shape on Ni(111) single crystal films MEIFANG LI, Brown University, JIEBING SUN, Michigan State University, JAMES HANNON, RUDOLF TROMP, IBM T.J. Watson Research Center, ERIC CHASON, Brown University — Graphene has great potential application in electronics due to its high carrier mobility. Graphene can be grown via chemical vapor deposition (CVD) on many metal surfaces, with Cu and Ni being the most studied. Ni(111) is particularly interesting because graphene is epitaxial and is strongly bound to the substrate. As we show, the epitaxial relationship strongly influences the domain shape. Here we describe in situ LEEM experiments to determine the equilibrium shape of graphene domains grown via dissolution and segregation at elevated temperature. We used a novel “real space diffraction” method, coupled with diffracted intensity calculations, to determine the crystallographic orientation of the graphene domains relative to the Ni(111) substrate. We find that the equilibrium shape supports zig-zag edges. However, the domain shape is triangular, rather than hexagonal, indicating that only one type of zig-zag edge is favored.

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