

Abstract Submitted  
for the MAR12 Meeting of  
The American Physical Society

Sorting Category: 12.1.2 (C)

**Imaging epitaxial graphene on SiC(0001) using STM with functionalized W tips**<sup>1</sup> S.H. RHIM<sup>2</sup>, Y. QI, G.F. SUN, Y. LIU, M. WEINERT, L. LI, U. Wisconsin-Milwaukee — Epitaxial graphene on SiC(0001) is studied using scanning tunneling microscopy with W tips functionalized by transition-metal (Cr, Fe) coatings, enabling the imaging of states within a few meV of the Fermi level that are not accessible with conventional W tips. First-principles modeling of these tips as pyramidal structures on W(110) indicates that an apex atom is stable for the Cr/W(110) tip but not for the Fe/W(110) or W/W(110) tips. Further calculations of the tunneling current show that the Cr- and Fe-coated tips can get significantly closer to the substrate than a bare W tip at a given current, and that the Cr (Fe) tip states contributing to the tunneling at low bias are spatially more localized than the W tip states. These characteristics lead to increased resolution, making possible the selective imaging of the complex electronic properties of the epitaxial graphene on SiC(0001)<sup>1,2</sup>.

<sup>1</sup>DOE (DE-FG02-05ER46228)

<sup>2</sup>present: Northwestern University

Prefer Oral Session  
 Prefer Poster Session

S. H. Rhim  
sonny@u.northwestern.edu  
Northwestern University

Date submitted: 15 Dec 2011

Electronic form version 1.4