

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Patterning graphene at the nanometer scale via hydrogen desorption¹ PAOLO SESSI, Politecnico di Milano, JEFFREY GUEST, MATTHIAS BODE, NATHAN GUISENGER, Argonne National Laboratory — We have demonstrated the reversible and local modification of the electronic properties of graphene by hydrogen passivation and subsequent electron-stimulated hydrogen desorption with an STM tip. In addition to changing the morphology, we show that the hydrogen passivation is stable at room temperature and modifies the electronic properties of graphene, opening a gap in the LDOS. This insulating state is reversed by local desorption of the hydrogen, and the unaltered electronic properties of graphene are recovered. Using this mechanism, we have “written” graphene patterns on nanometer length scales. This reversible and local mechanism for modifying the electronic properties of graphene has far-reaching implications for nanoscale circuitry fabricated from this revolutionary material.

¹Use of the Center for Nanoscale Materials was supported by the U. S. Department of Energy, Office of Science, Office of Basic Energy Sciences, under Contract No. DE-AC02-06CH11357.

Jeffrey Guest
Argonne National Laboratory

Date submitted: 22 Dec 2009

Electronic form version 1.4