Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Hetero epitaxial graphene on various substrates[1] GARY HARRIS, HNF-Howard University, GURPREET KAUT, CRAWFORD TAYLOR, Howard University — Large-scale production of graphene is pivotal for the development of graphene-based electronics. These results focus on the synthesis and characterization of graphene layers. Two methods were used to grow graphene films. First, graphene films were epitaxially grown on silicon carbide substrates by thermal decomposition of SiC at high temperature and low pressure. In-house built reactor consisting of induction furnace was used to form epitaxial films for electronic applications. Second, chemical vapor deposition method was used for direct graphene synthesis on 3C-SiC with the use of copper as a catalyst. In thermal CVD process, hydrogen and methane gases were used as precursors. Methane acts as a carbon source and annealing and cooling were done hydrogen environment. Different polytypes of silicon carbide (6H-SiC and 3C-SiC) and their crystal orientations were exploited as substrates to form epitaxial graphene. Hetero epitaxial 3C-SiC epilayer was first deposited on Si substrate using chemical vapor deposition technique in cold wall, low pressure, and horizontal CVD reactor. The reactor temperature, argon pressure, flow rates and concentration of different gases (propane, silane, hydrogen and argon) was investigated to control the growth of 3C-SiC and silicon sublimation rate. The resulting graphene films were confirmed using Raman spectroscopy. Further, graphene films have been characterized with the tools of atomic force microscopy (AFM) and scanning electron microscopy (SEM). Mobility, electrical resistivity and carrier density measurements were taken using hall measurements.

[1]NSF_PRDM

Gary Harris
Howard University

Date submitted: 14 Nov 2014 Electronic form version 1.4