Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Plasma enhanced atomic layer deposition of ultrathin oxides on graphene[1] CHRISTIE J. TRIMBLE, ANNA M. ZANIEWSKI, MANPUNEET KAUR, ROBERT J. NEMANICH, Arizona State University — Graphene, a single atomic layer of sp2 bonded carbon atoms, possesses extreme material properties that point toward a plethora of potential electronic applications. Many of these possibilities require the combination of graphene with dielectric materials such as metal oxides. Simultaneously, there is interest in new physical properties that emerge when traditionally three dimensional materials are constrained to ultrathin layers. For both of these objectives, we explore deposition of ultrathin oxide layers on graphene. In this project, we perform plasma enhanced atomic layer deposition (PEALD) of aluminum oxide on graphene that has been grown by chemical vapor deposition atop copper foil and achieve oxide layers that are <1.5 nm. Because exposure to oxygen plasma can cause the graphene to deteriorate, we explore techniques to mitigate this effect and optimize the PEALD process. Following deposition, the graphene and oxide films are transferred to arbitrary substrates for further analysis. We use x-ray photoelectron spectroscopy, Raman spectroscopy, and atomic force microscopy to assess the quality of the resulting films.

[1]This work is supported by the National Science Foundation under Grant # DMR-1206935.

Christie J. Trimble
Arizona State University

Date submitted: 14 Nov 2014 Electronic form version 1.4