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Plasma Enhanced Atomic Layer Deposition Nucleation Performance on Atomically Smooth Graphene Surfaces TREVOR VAN ENGELHOVEN, ANNA ZANIEWSKI, MANPUNEET KAUR, CHRISTIE TRIMBLE, Arizona State University, WILL GANNETT, Humboldt State University , MARK KELLER, National Institute of Standards and Technology, ROBERT NEMANICH, Arizona State University — Electronics using graphene may lead to the next generation of computation and innovative devices. Layering dielectrics with graphene is key to realizing many of these functional devices. Plasma enhanced atomic layer deposition (PEALD) is a novel way to introduce dielectrics to graphene, however graphene is susceptible to etching by PEALD. This motivates us to explore the role of graphene quality on film nucleation and graphene robustness. In this experiment we will use spectroscopy and atomic force microscopy to quantify film and graphene quality. Here we will present the experimental design, initial findings and theory behind this upcoming research. At the current stage of experimentation sample holders have been designed and machined, control C-AFM data has shown smoothness of 4-6 nm with strong conductivity. We discuss how graphene quality, plasma conditions, and ample geometry may play a role in post-PEALD graphene quality and film nucleation.

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