

Area-Selective Growth of Metal Oxide on Graphene Flakes

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Introduction

- Next generation electronics will require the control of matter at the nanoscale.
- We are working towards achieving this control with metal oxide growth on graphene flakes.

Methods

- Defects are created on the surface of graphene flakes in an environmental scanning electron microscope.
- Atomic layer deposition can occur at these defect anchors, and does not occur on the otherwise pristine graphene surface.
- Atomic force microscopy and energy dispersive x-ray spectroscopy gives us information about the metal oxide growth.



Ironing out a problem

- Early on, we were using photolithography to create landmarks on substrates.
- This introduced several unwanted materials.
- We wrote a python code to travel between previously located graphene flakes, which removed the need for landmarks and allowed faster electron microscope scanning.



Raman Spectroscopy

- One variable that we struggled to control was the thickness of the graphene we were working with.
- Raman spectroscopy tells us how many layers make up a graphene flake.



CVD Grown Graphene

- We currently exfoliate graphene from bulk samples of highly ordered pyrolytic graphite with a top down tape method.
- The presence of tape residue might be affecting results.
- Chemical Vapor Deposition allows us to grow graphene on top of a copper surface, which would result in a cleaner graphene sample.



