

# Fabricating Electronic Devices Using Graphene Monolayers

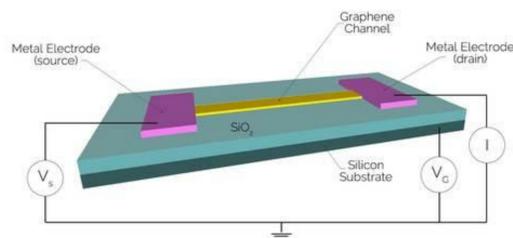
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## INTRODUCTION

In 2004, Andre Geim and Kostya Novoselov discovered the method to remove a single layer of carbon lattice (graphene) from graphite. Thanks to this Nobel Prize winning discovery, graphene has since then revolutionized electronics.

Graphene is a monolayer of carbons in a tightly bound, hexagonal lattice. It is commonly used as a field effect transistor, an electrical component that modulates current flow.



## METHOD

1. Remove graphene from graphite using the mechanical exfoliation technique
2. Fabricate the graphene field effect transistor based on the exfoliated graphene
3. Measure the graphene field effect transistor using the Lakeshore probe station
4. Use the dry transfer method by spin coating PMMA onto the substrate and using PDMS to lift it off in order to create 2D heterostructures
5. Measure the electronic properties of the p-n junction based on the 2D heterostructures

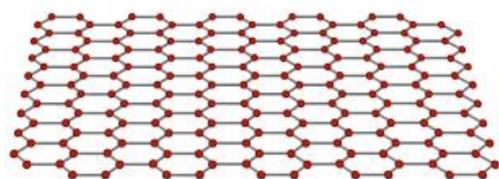


Graphene Monolayers

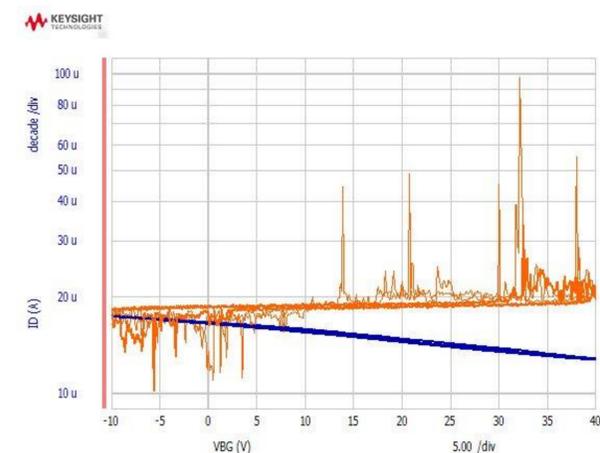
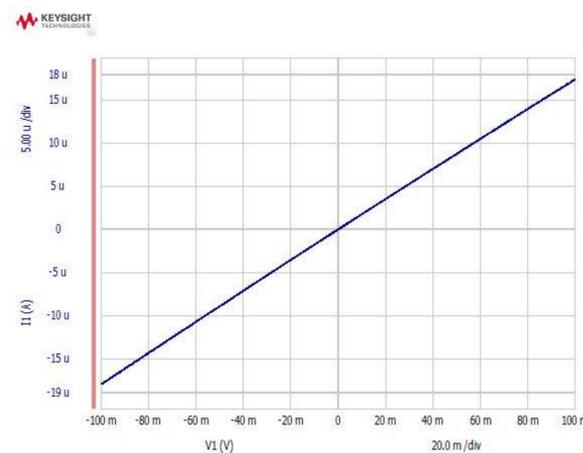


## AIM

The aim of this project is to use the method of mechanical exfoliation to create 2D materials and fabricate and measure electronic devices based on those 2D materials.



Sheet of Graphene



Measurements of Device

## CONCLUSIONS/RESULTS

In these 6 weeks, we were not able to complete the device due to issues with the transfer process, but we were successful in other components of fabricating the device.

This program was very impactful and a great learning experience. This program helped me gain valuable insight as to what my future could look like. It opened up a lot of possibilities for my future career and I am very thankful for that.

## WHAT NEXT?

With the fabrication of such devices, graphene can be used to further advance technology. By continuing to test electronic devices fabricated from graphene, technology can improve by utilizing such a versatile material. Its applications are endless so we will continue to fabricate and test electronic devices made from 2D materials.

## ACKNOWLEDGEMENTS

