

# Investigation of Structural, Electron Transport, and Microwave Absorption Properties of $\text{La}_{0.4}(\text{Ca}_{0.4}\text{Sr}_{0.2})\text{MnO}_3$

*Hyeyon Kim<sup>1</sup>, Christopher Schayer<sup>2</sup>, Dr. L.L Henry<sup>3</sup>*

*<sup>1</sup>Vanderbilt University*

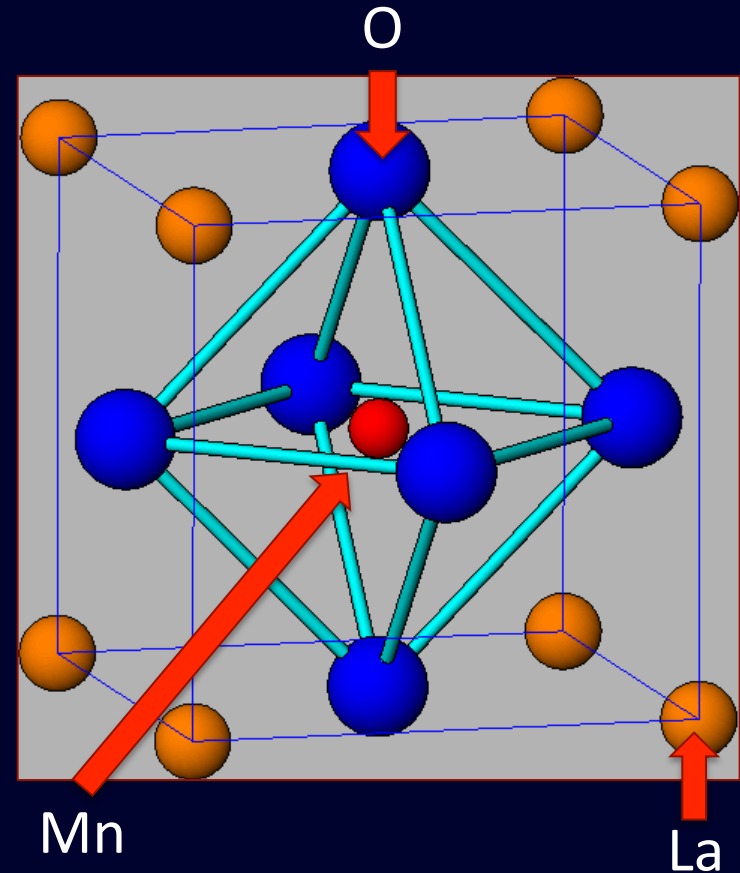
*<sup>2</sup>Louisiana State University*

*<sup>3</sup>Southern University*



# Introduction

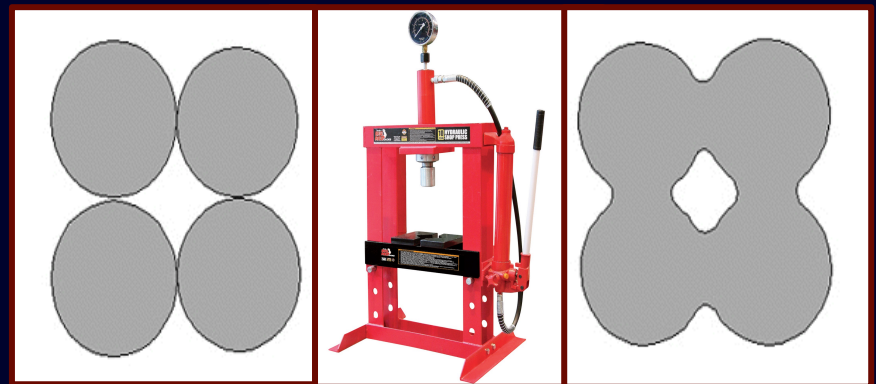
- $\text{LaMnO}_3$ 
  - Ceramic
  - Perovskite crystal structure
- Doped  $\text{LaMnO}_3$  results in:
  - Colossal magnetoresistance



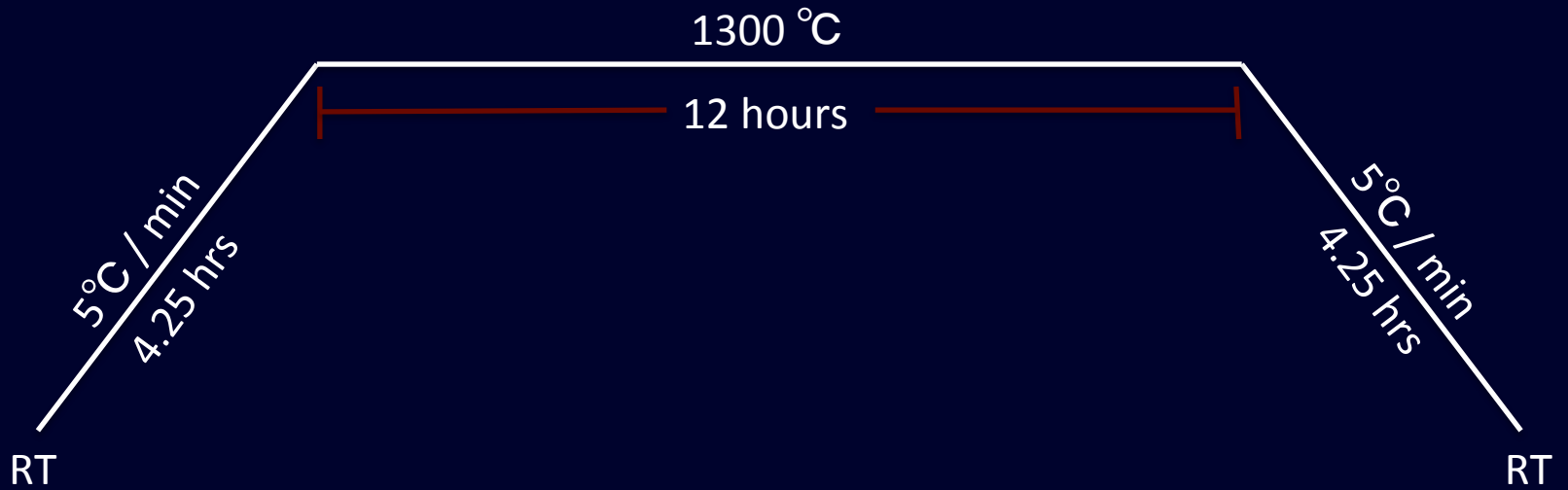
# Synthesis

- Grind compounds
- Calcination
  - Removes  $\text{CO}_2$  and excess  $\text{O}_2$
- Sintering
  - Pressure and heat to form a solid mass

Compound	Rounded
$\text{La}_2\text{O}_3$	2.1 g
$\text{SrCO}_3$	1 g
$\text{CaCO}_3$	1.3 g
$\text{MnO}_2$	2.8 g

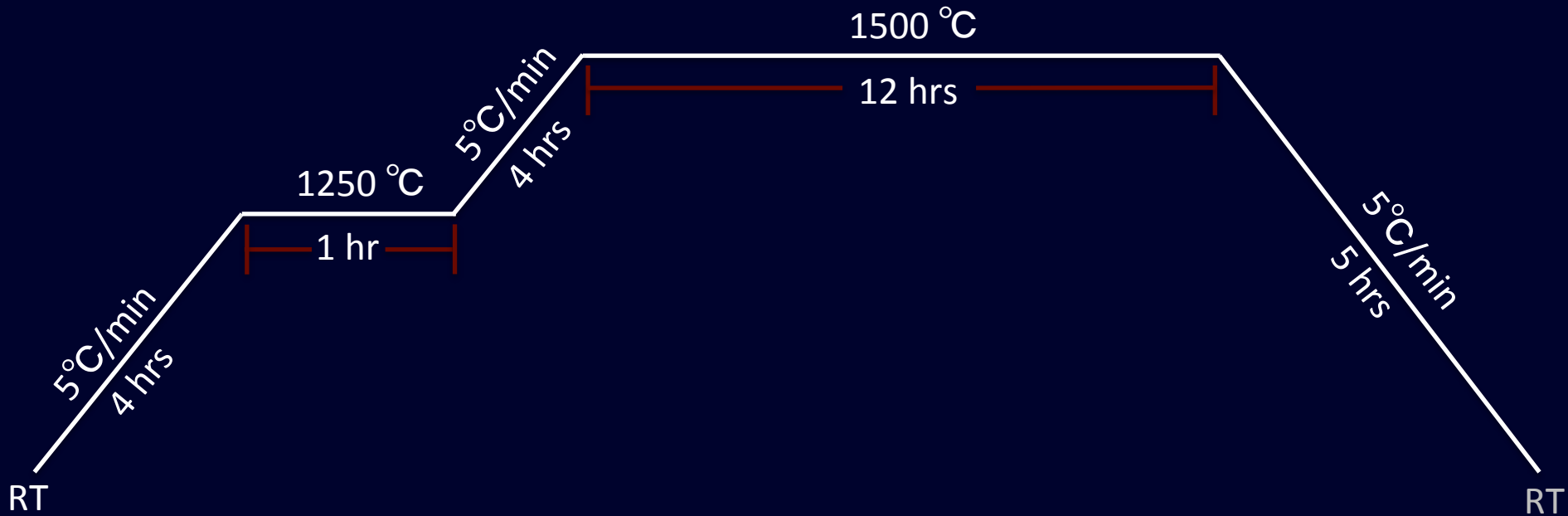


# Calcination



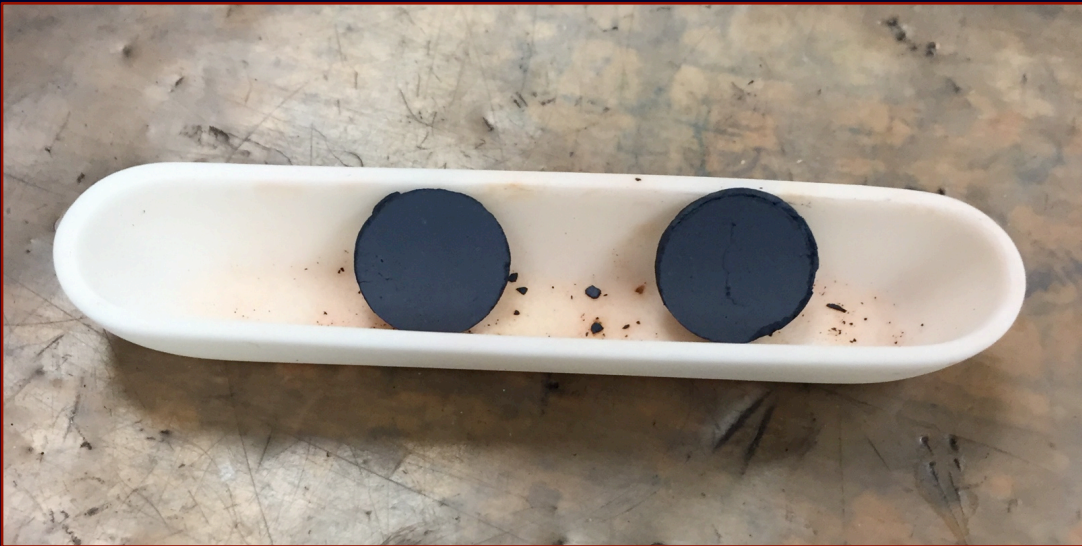


# Sintering

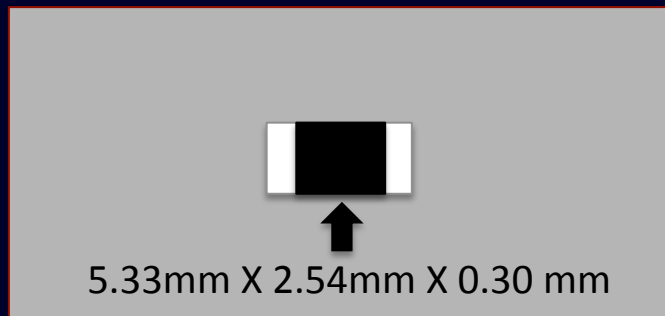


# Sintered Pellets

- Hard, shiny, slightly magnetic



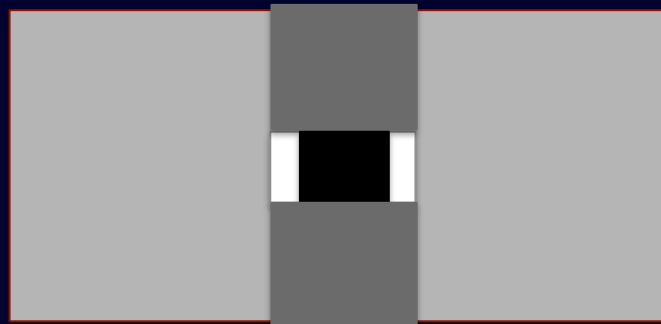
# Making the thick film



+

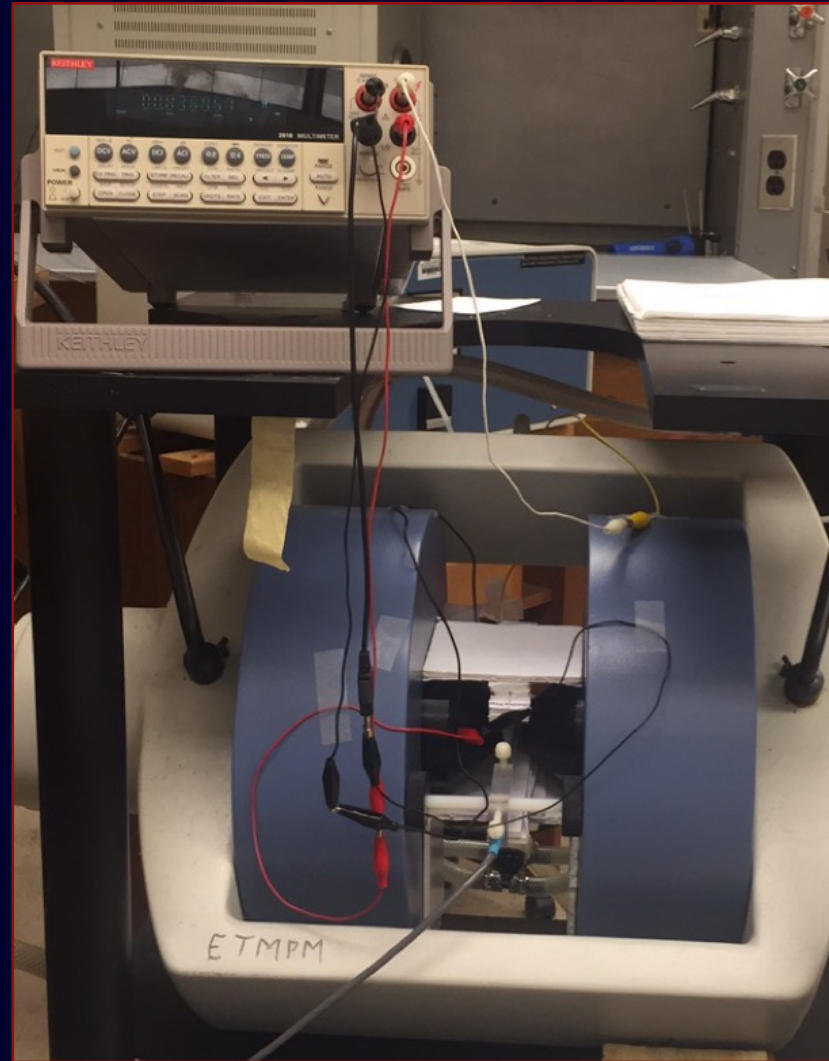
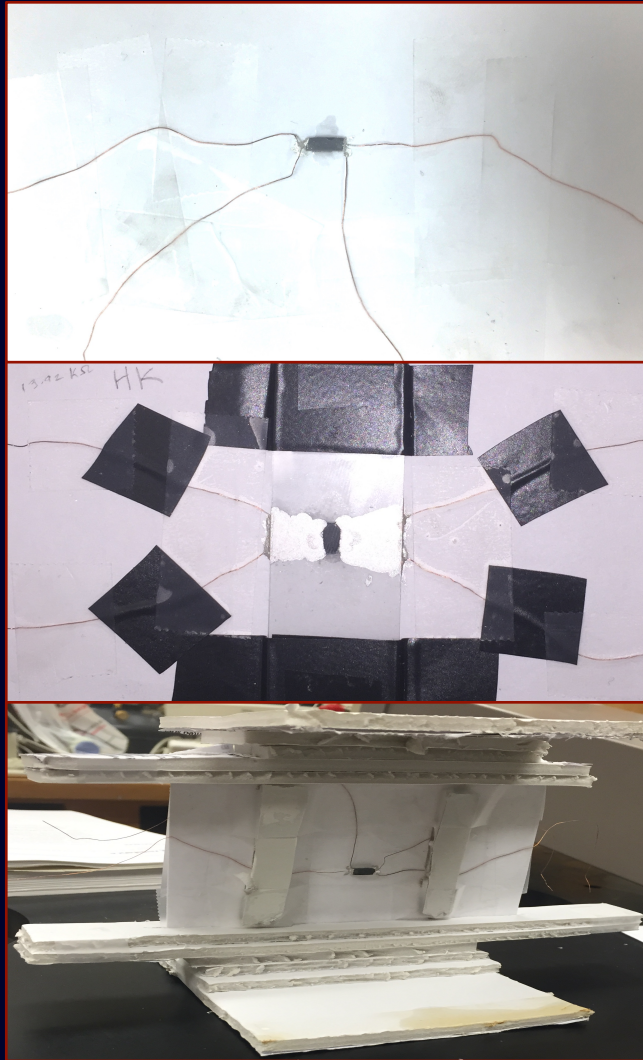


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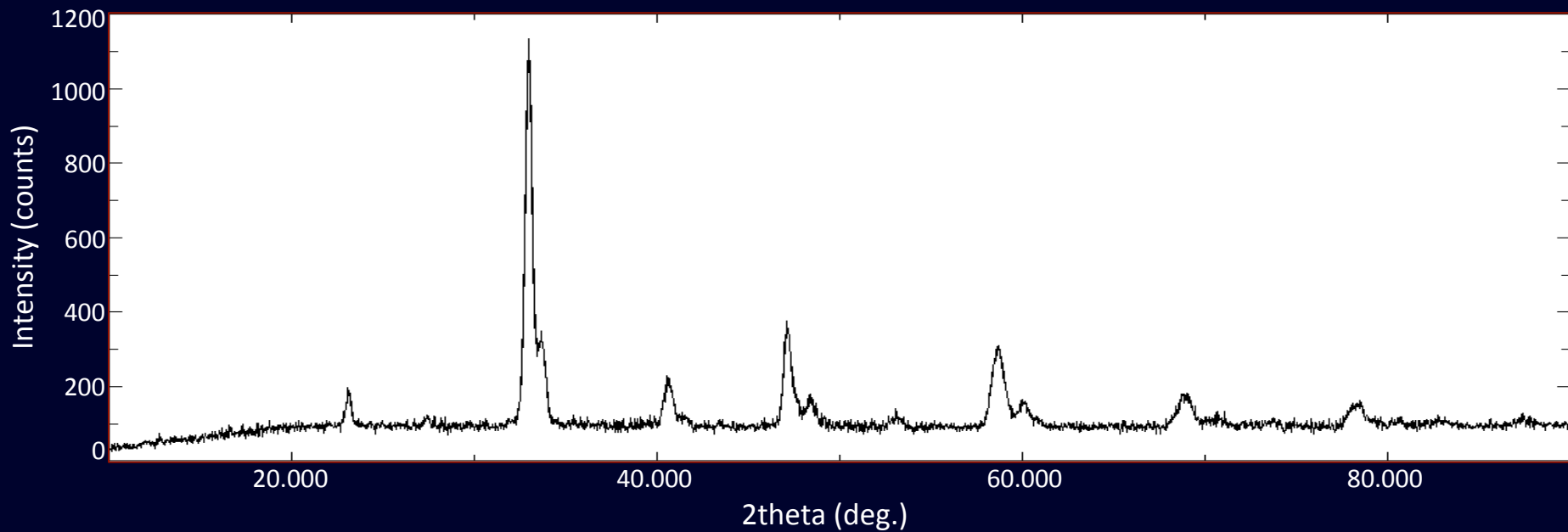


-  Glass slide
-  Clear nail polish
-  Sample
-  Silver paint

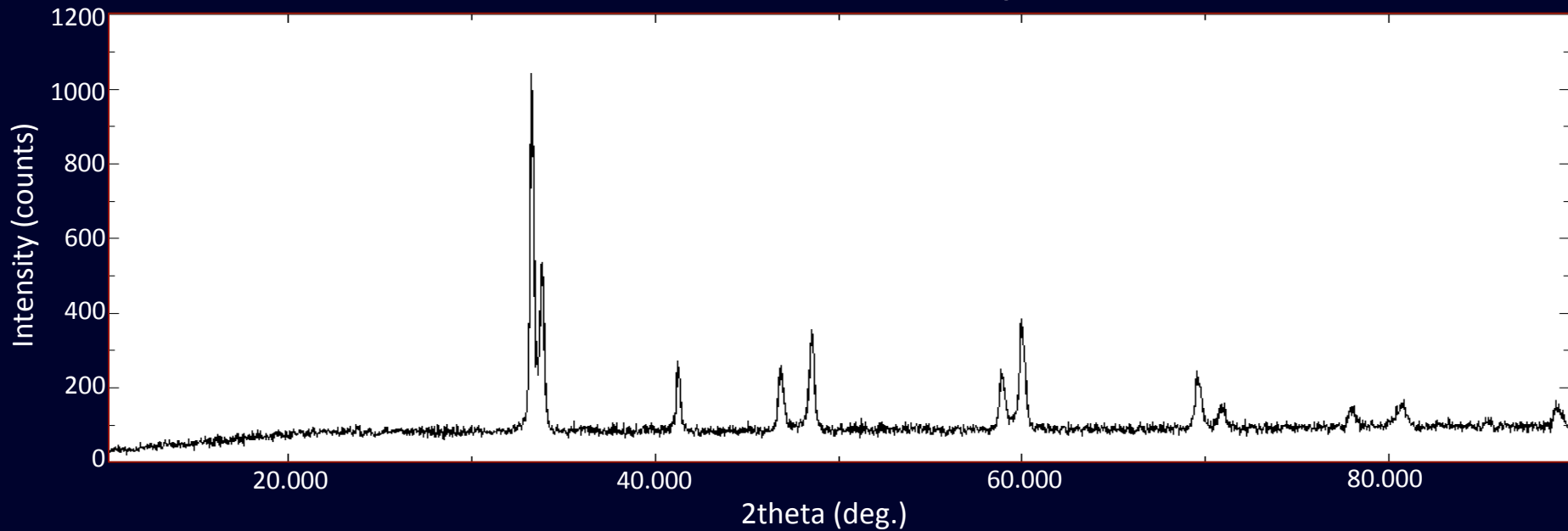
# Magnetoresistance



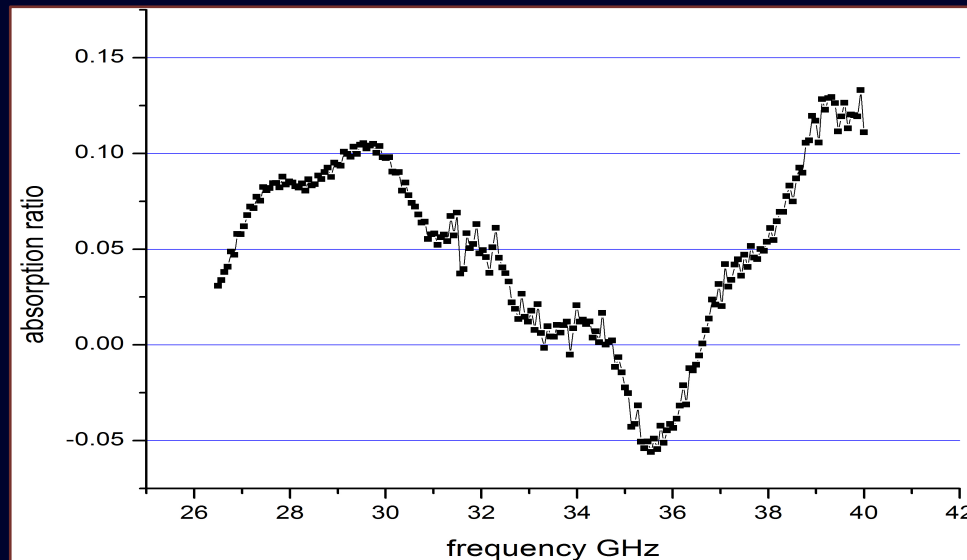
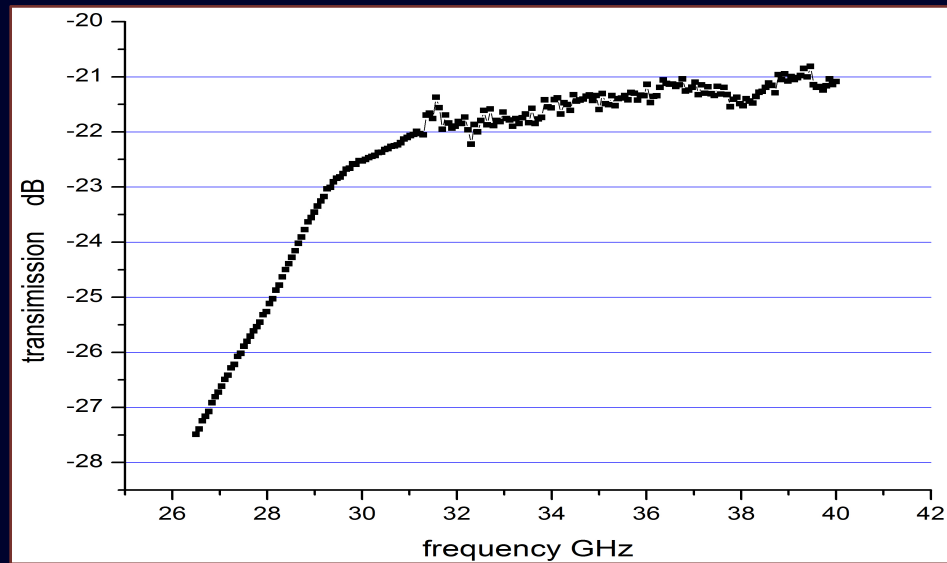
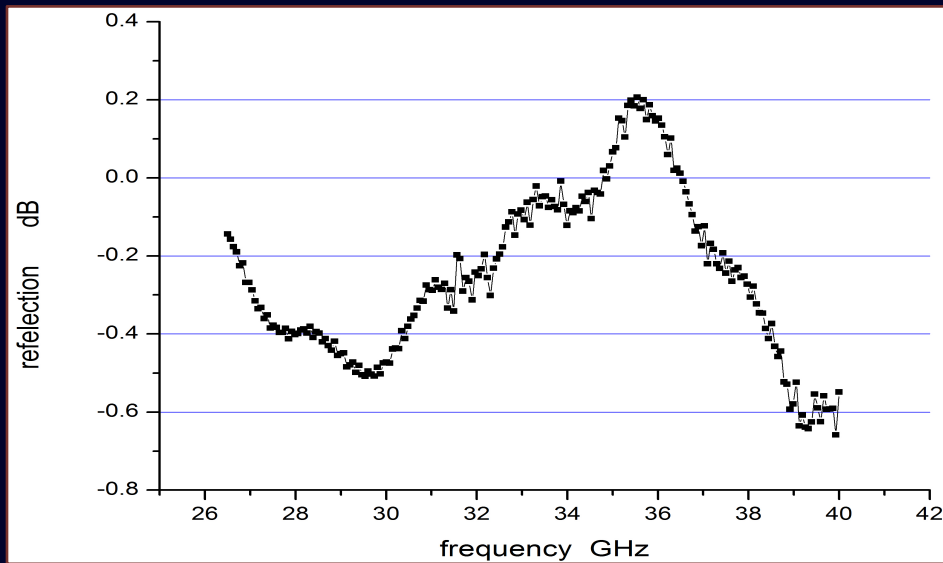
## XRD on Calcined Sample



## XRD on Sintered Sample

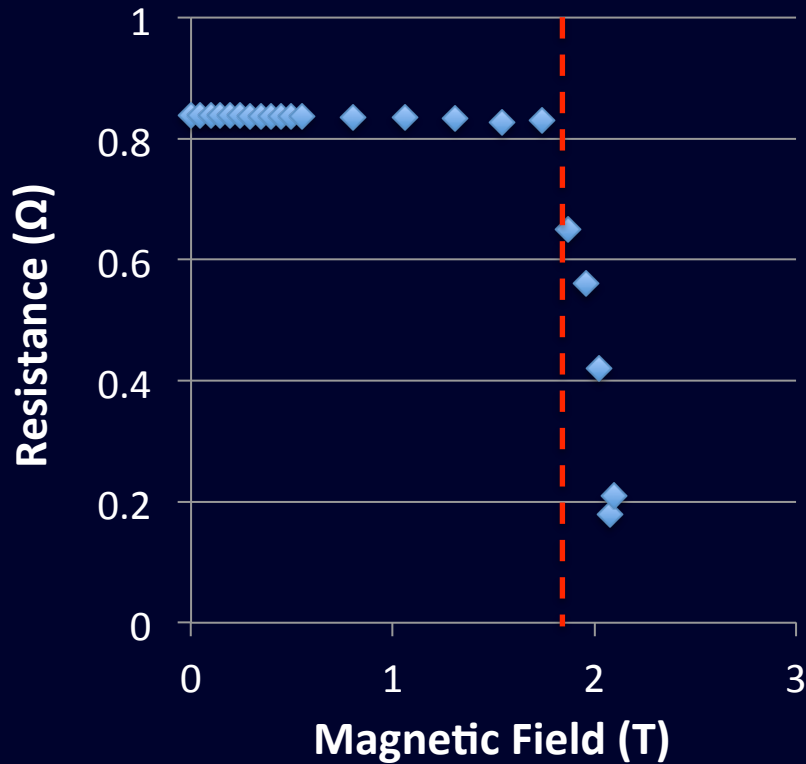


# Microwave Absorption

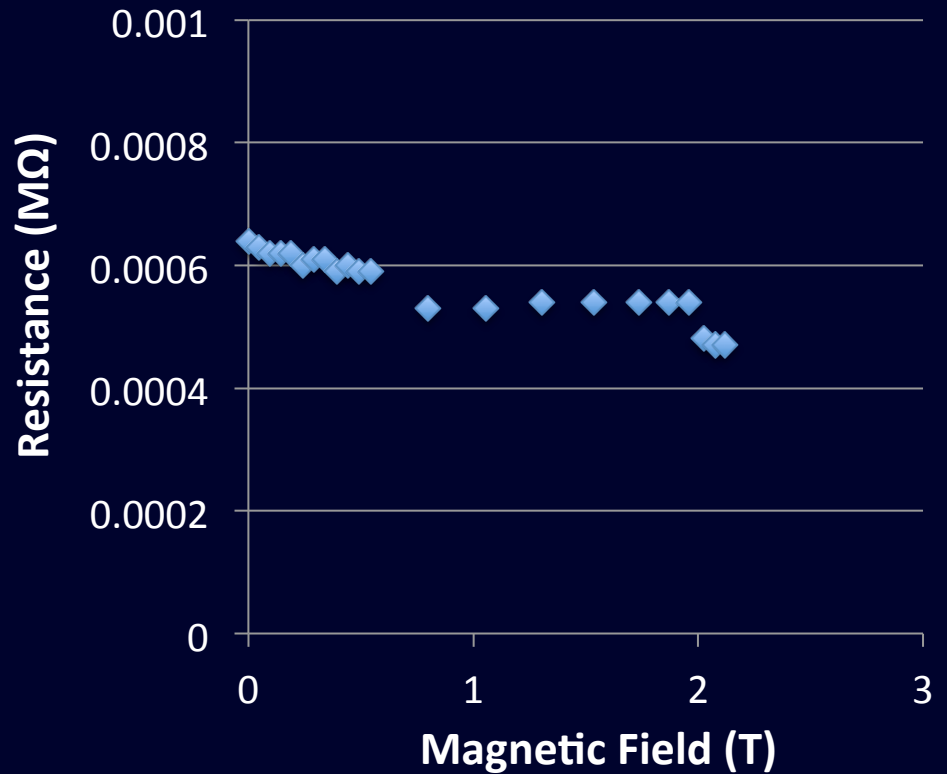


# Magnetoresistance (bulk)

## Trial 1



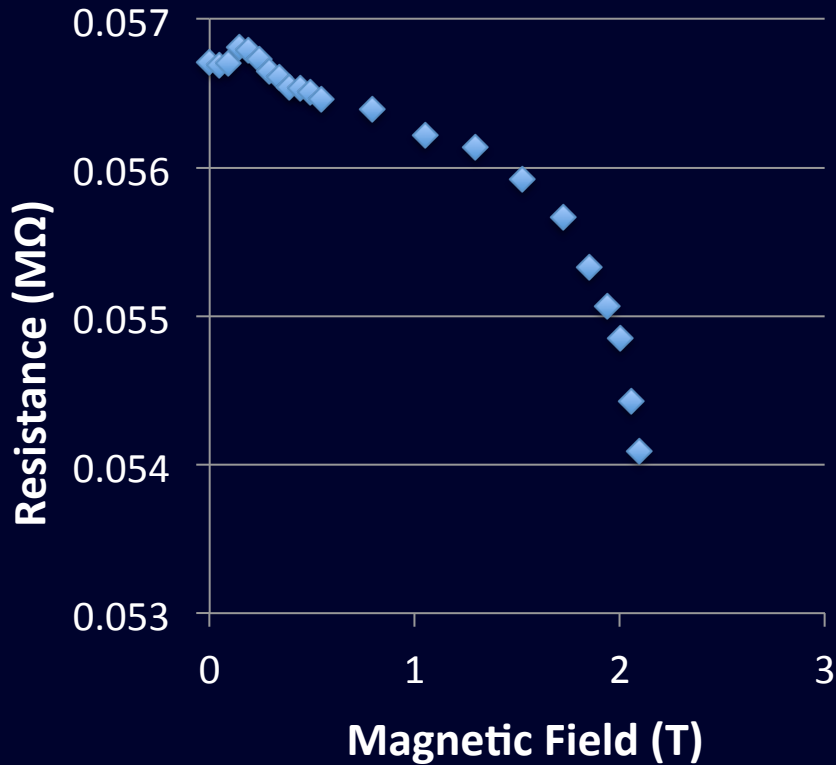
## Trial 2



30.63% decrease

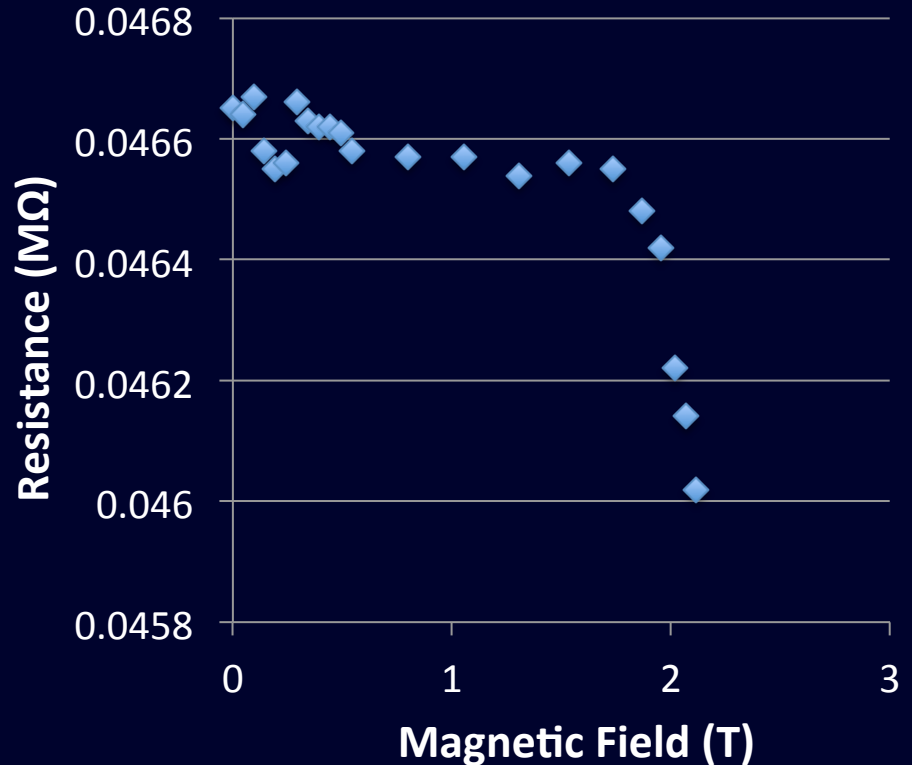
# Magnetoresistance (powder)

## Trial 1



4.73% decrease

## Trial 2



1.36% decrease



# Conclusion

- Increased magnetic field caused a small decrease in electrical resistance
- Future work
  - Magnetoresistance of bulk and powder samples exposed to:
    - Varying temperatures
    - Ultraviolet rays

# Acknowledgments

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# References

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Questions?