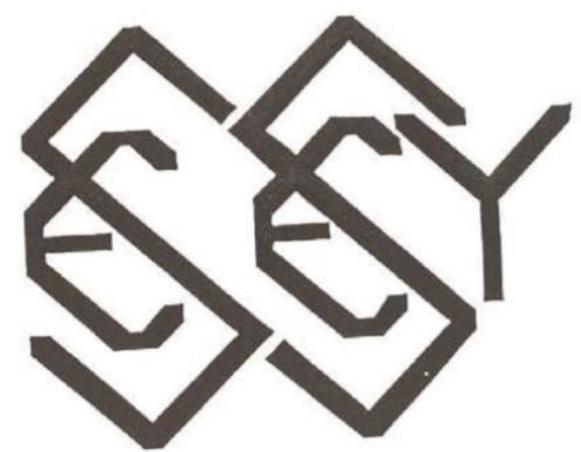


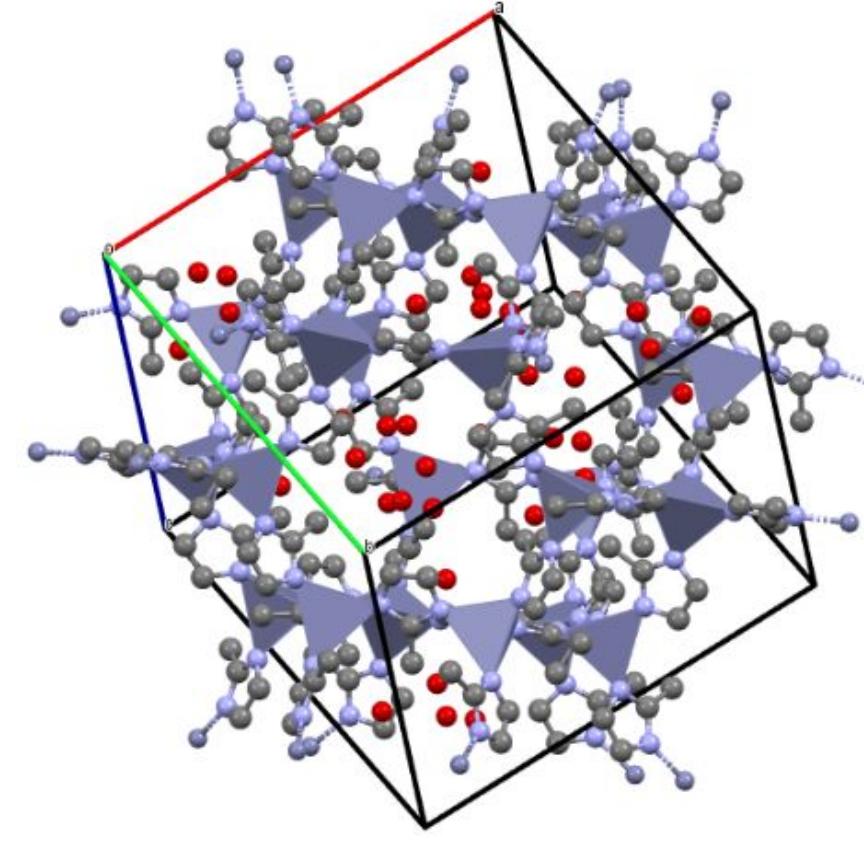


Oregon State
University



Investigation of MOF ZIF-8 growth/synthesis and characterization

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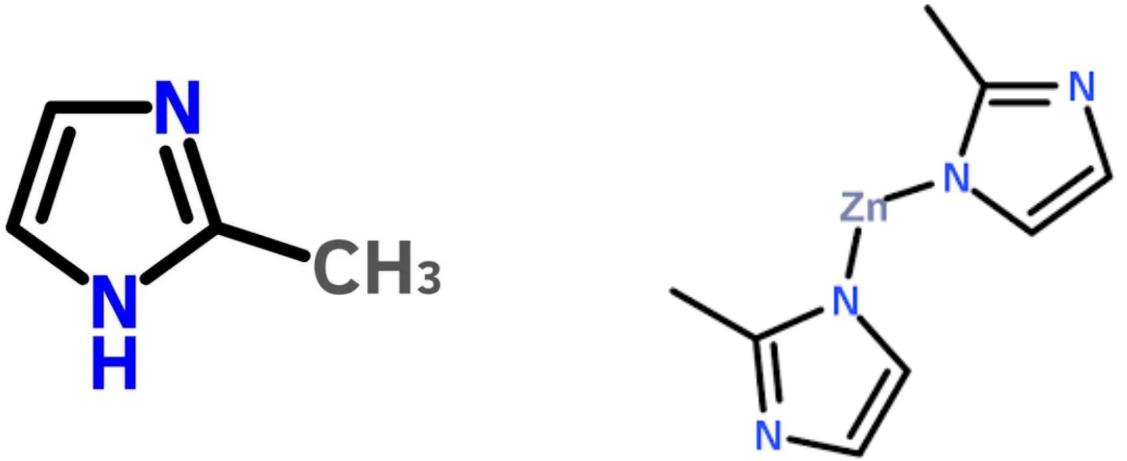


Introduction

→ Metal-Organic Framework

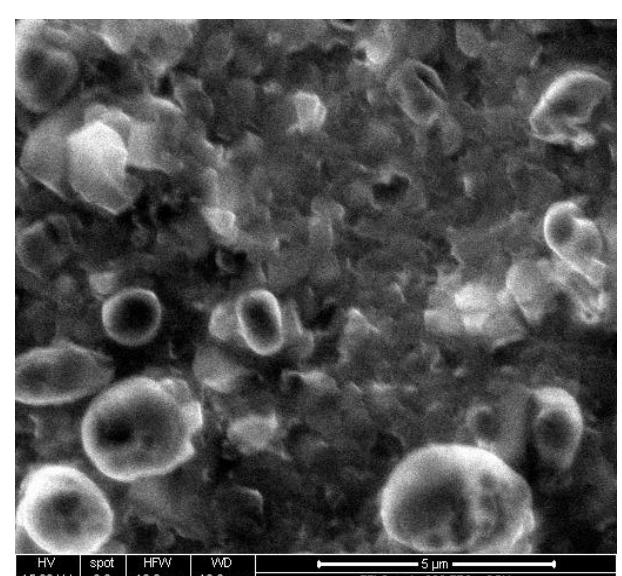
- Porous and crystalline structure produced by combining a metal and an organic linker
- Can be used for gas sensing, drug separations, catalysis, etc.

Net Ionic Chemical Equation:

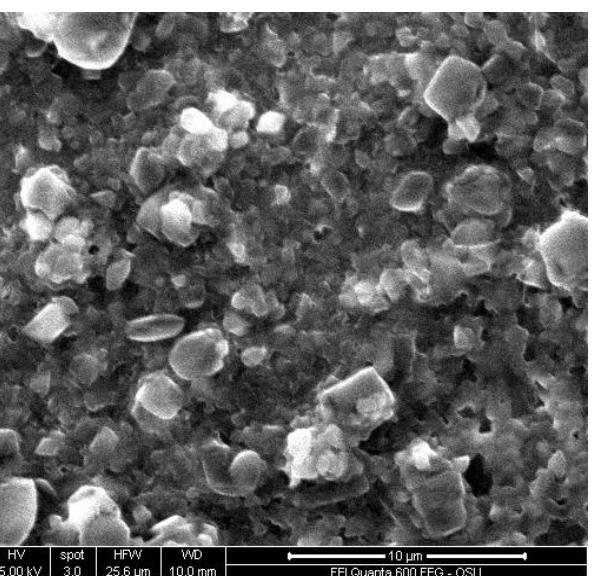


Scanning Electron Microscopy (SEM)

5μm = 10,000x magnification



10μm = 5,000x magnification



→ Zeolitic imidazolate framework-8 (ZIF-8)

- Made with Zinc Nitrate Hexahydrate and 2-Methylimidazole

→ Experimentation

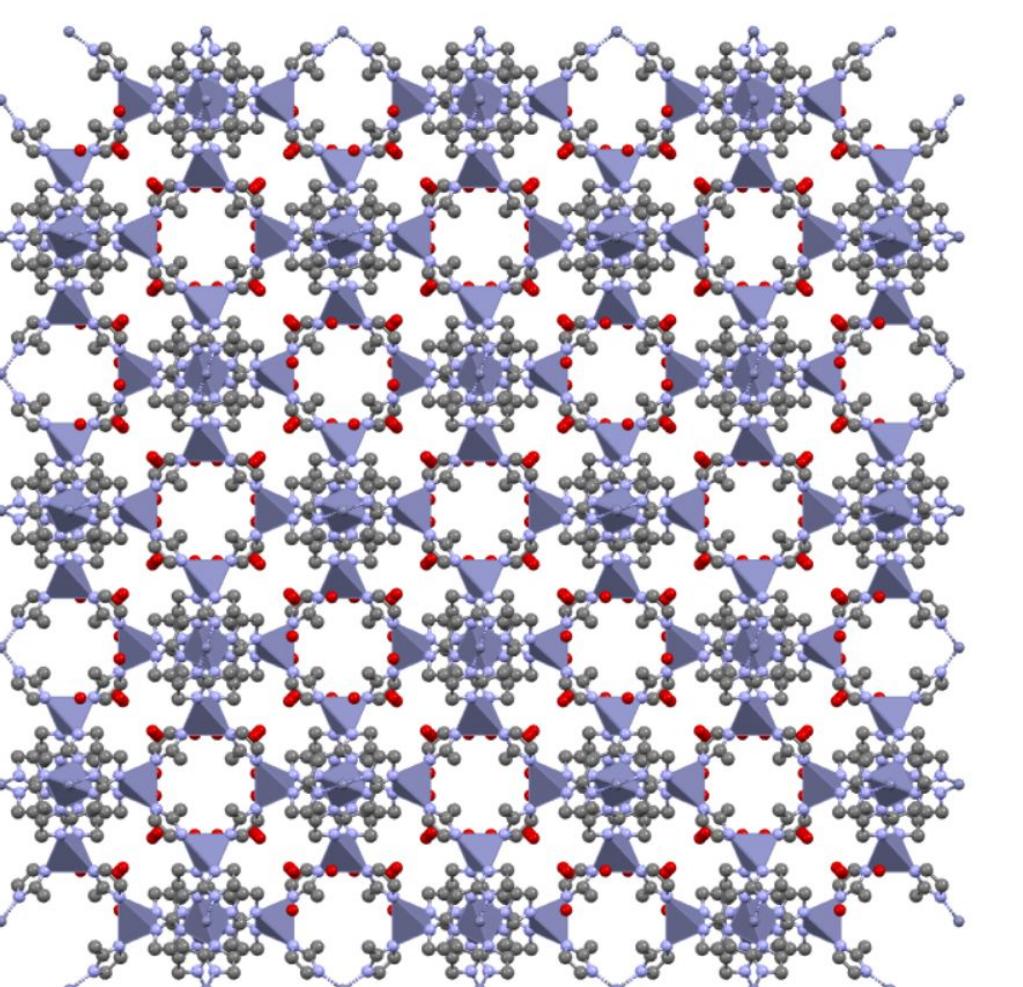
- Three solvents used:
 - 100% Water
 - 100% Methanol
 - 50% Methanol & 50% Water

Experimental Process

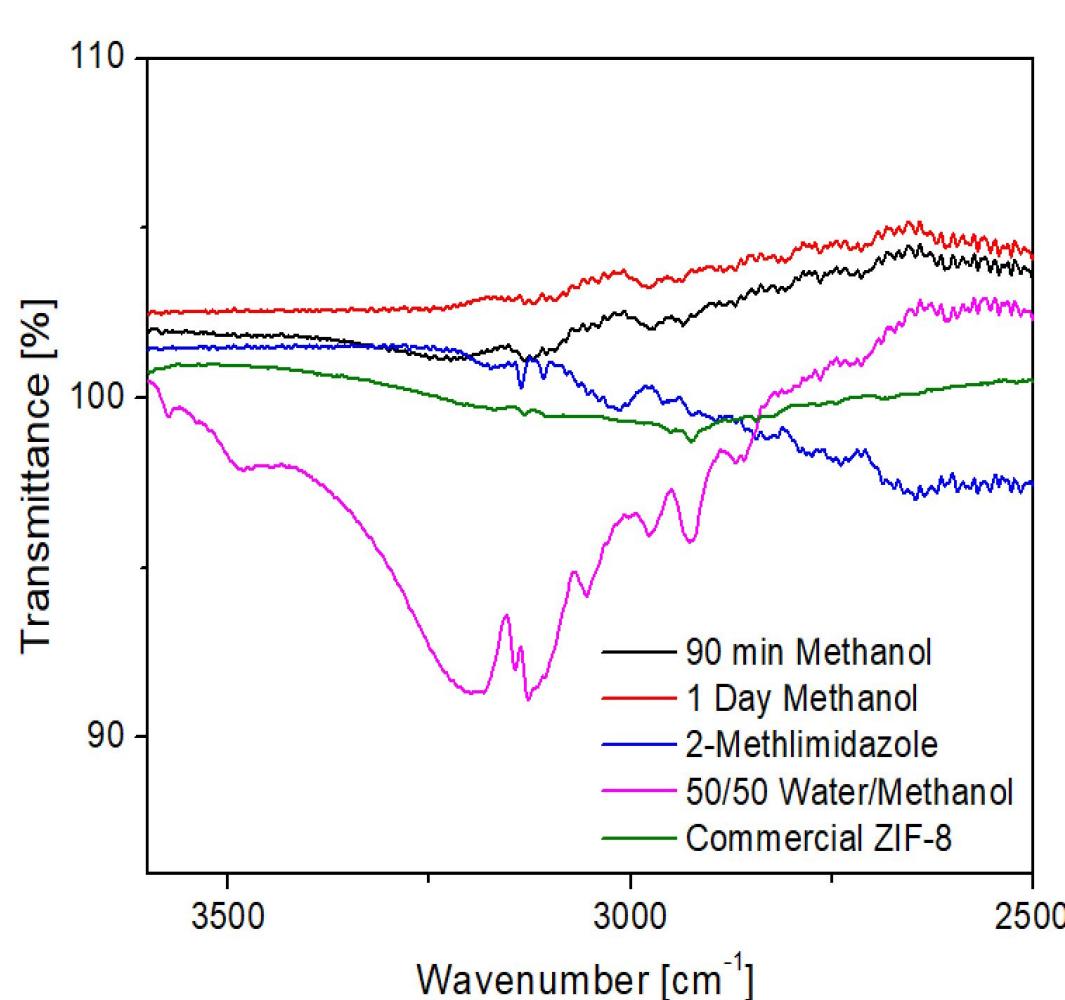
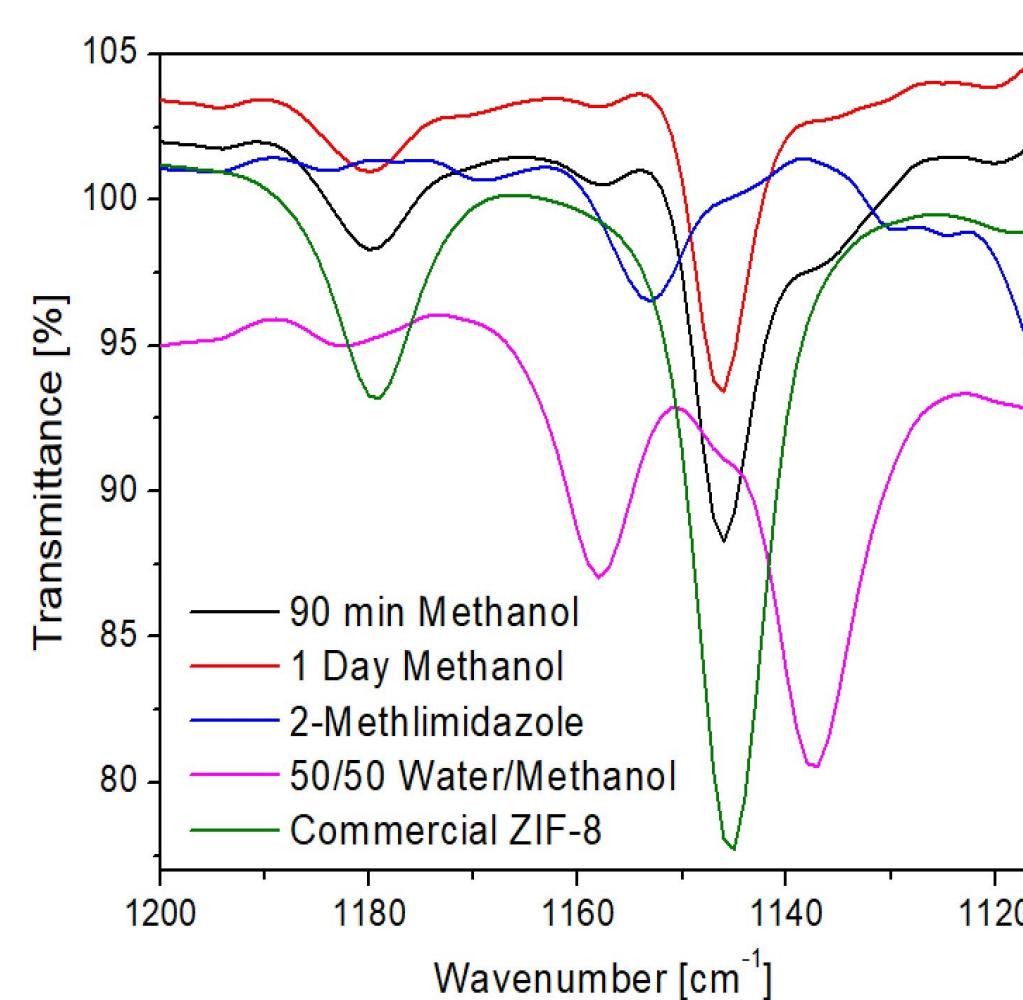
1. Combine Zinc Nitrate Hexahydrate and 2-Methylimidazole solutions with corresponding solvents
2. Centrifuge solutions, rinse and repeat two to three times (5,000 rpm for 3 minutes)
3. Dry ZIF-8 (vacuum oven, 70°C) into powder (sediment from centrifuging)
4. Characterize!!



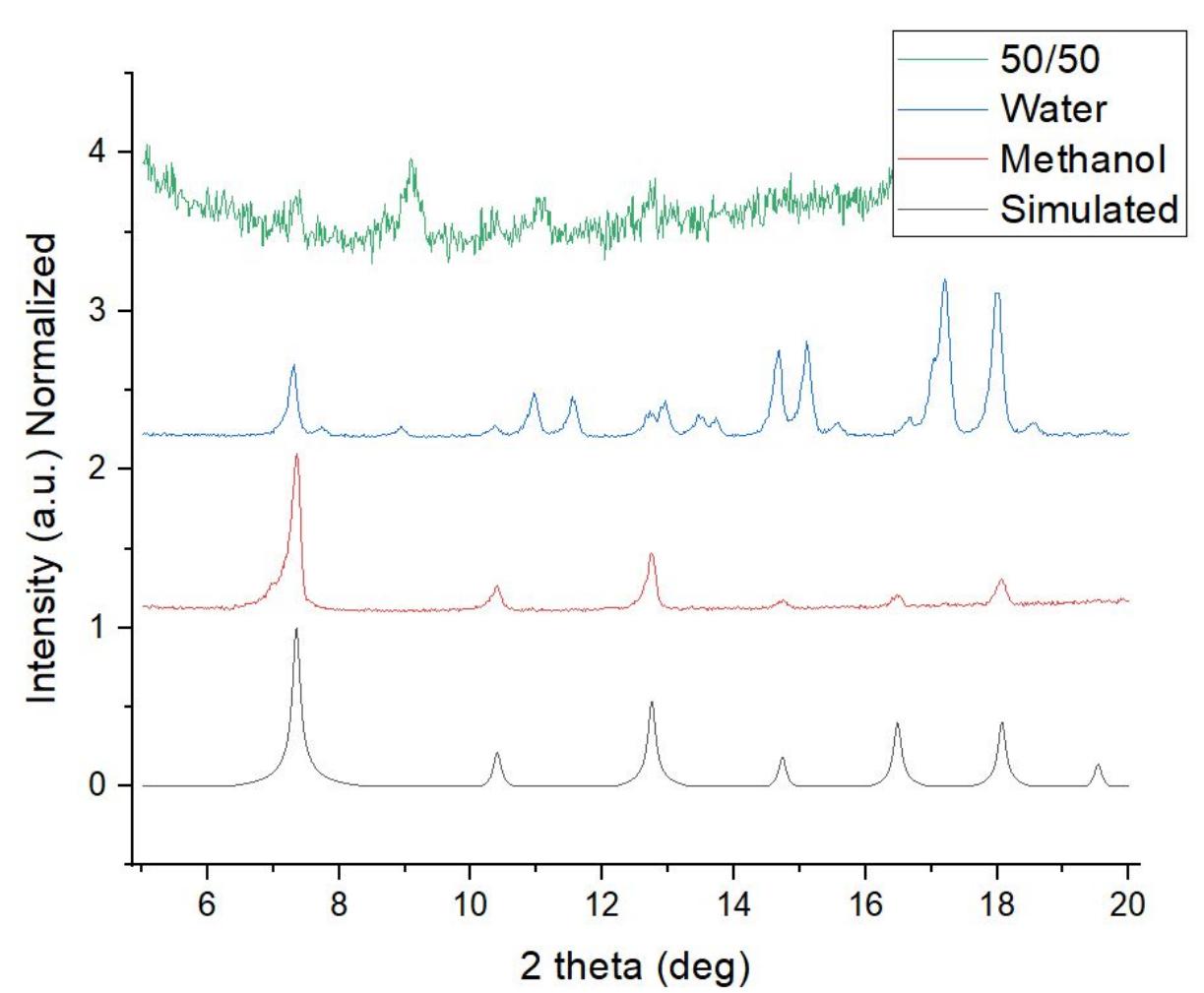
Single Crystal Structure



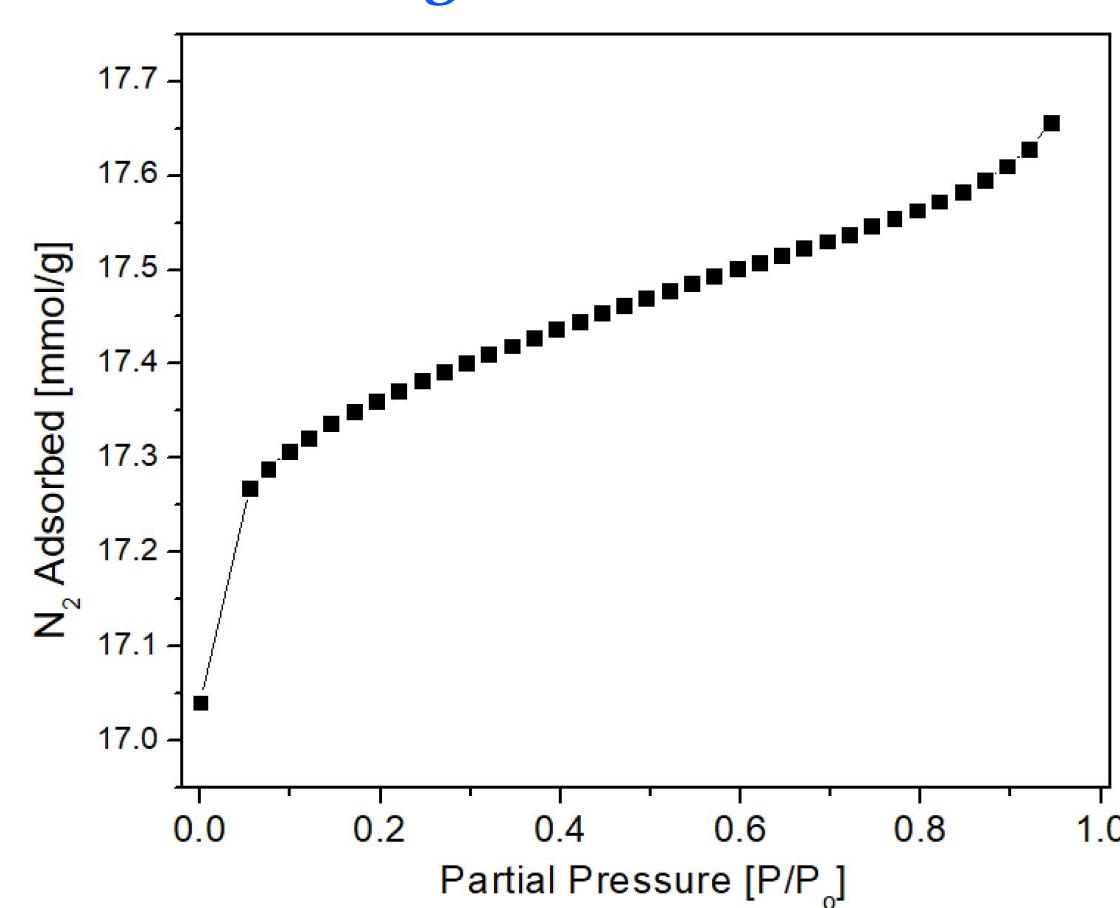
Fourier Transform Infrared (FTIR)



X-Ray Diffraction (XRD)

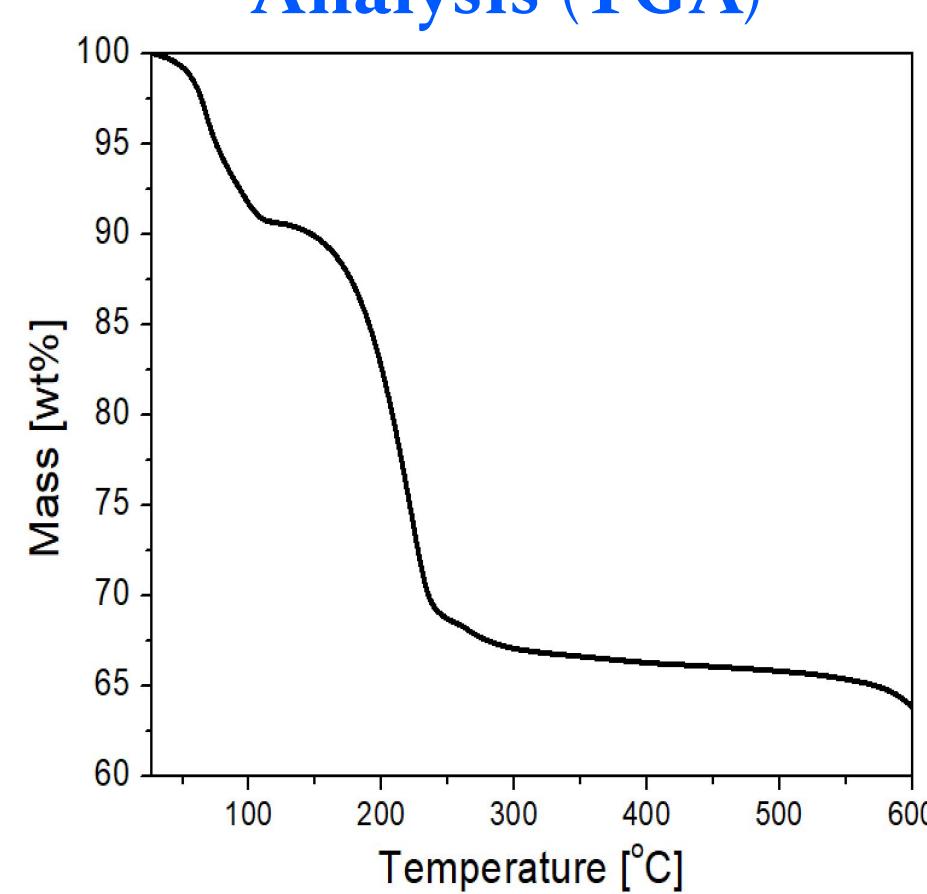


Nitrogen Isotherm (NI)



Surface area: 1205 m²/g
 For 11 mg: 13 m²

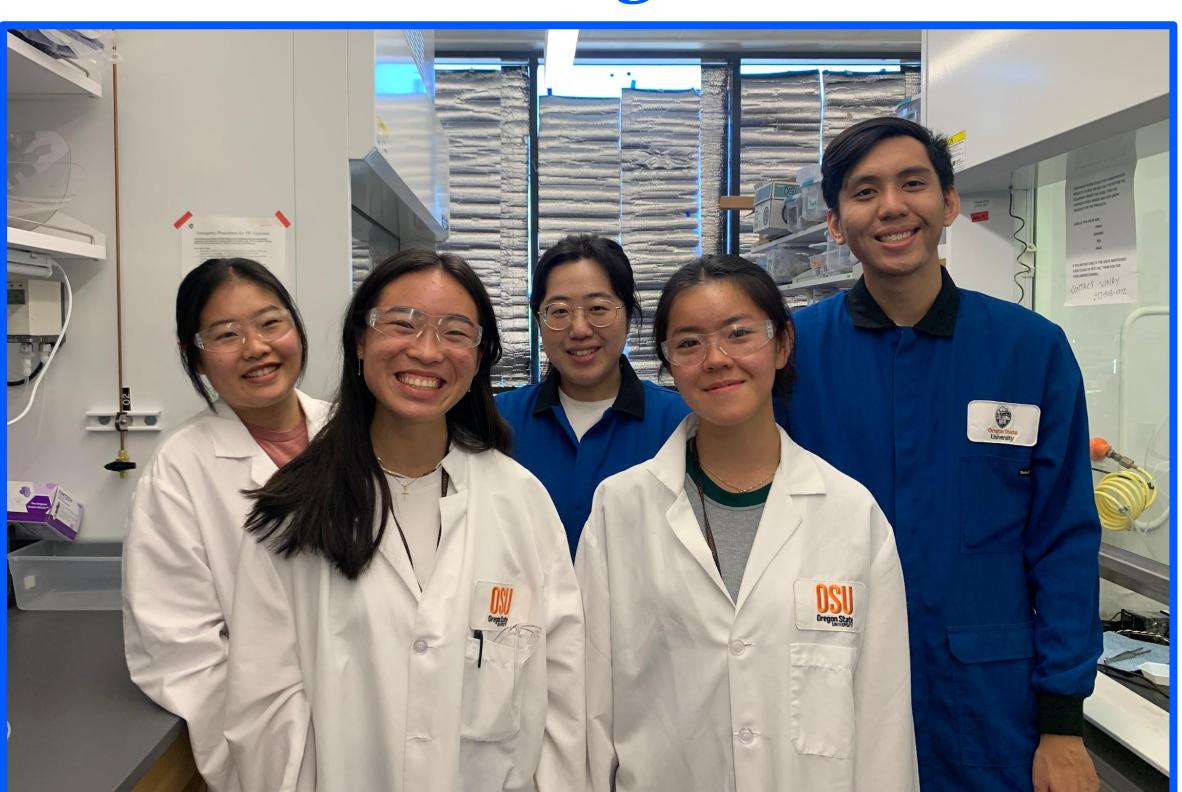
Thermogravimetric Analysis (TGA)



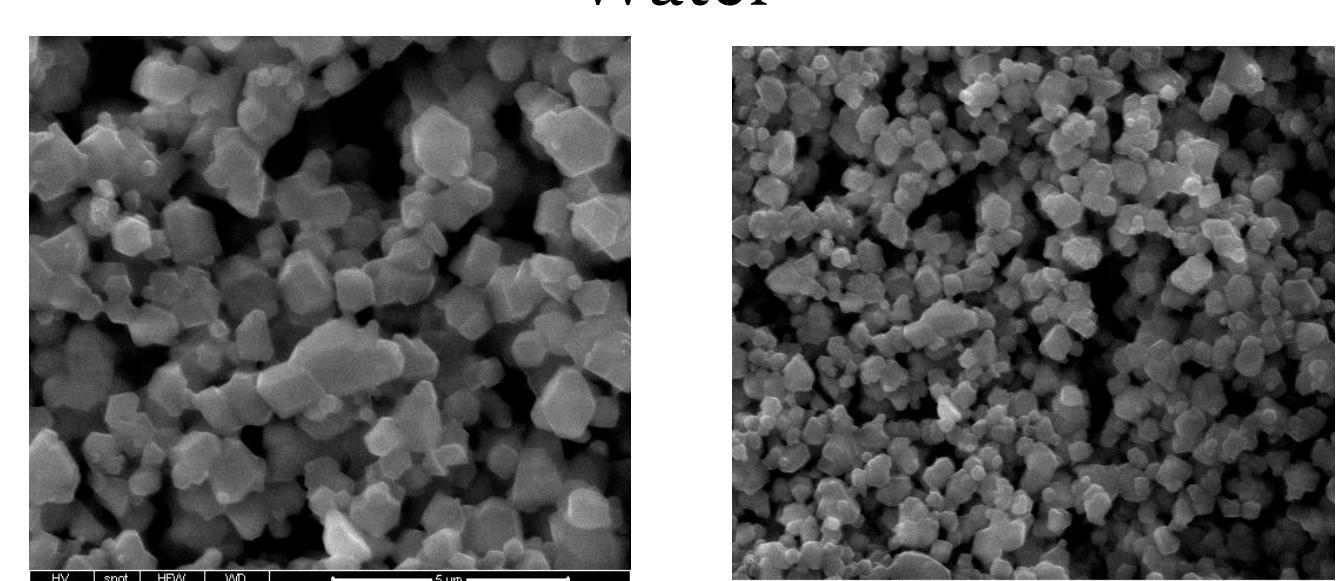
Acknowledgements

Results:

- Water ✗
- Methanol ✓
- 50% Methanol &
- 50% Water ✗



We would like to thank our amazing mentors for their guidance and support on this project. We would also like to thank Dr. Skip Rochefort and SESEY for this opportunity.



Methanol

- **1 day Methanol Yield:** 11 mg
- **Theoretical Yield:** 757 mg
- **Percent Yield:** 1.45%

