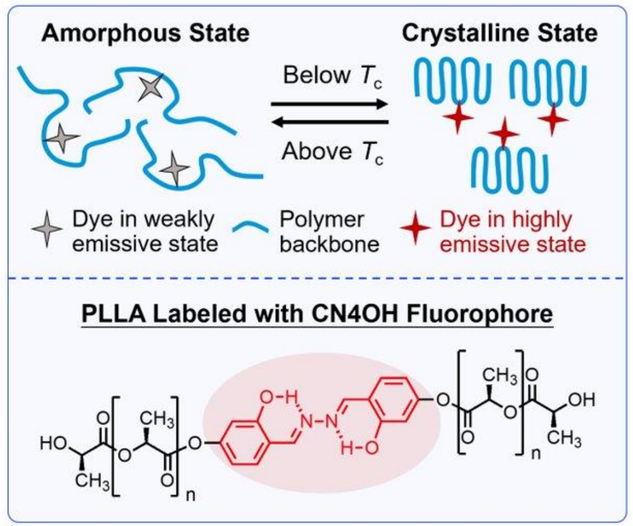
Sensing crystallinity during non-isothermal melt crystallization processes in semicrystalline polymers

Maya Cabello, Chemical Engineering
Mentor: Kailong Jin, PhD
School for Engineering of Matter, Transport and Energy

Introduction

Using a fluorescence technique previously researched by the Jin group, bulk non-isothermal crystallization behavior in single layer PLLA was studied. The change in emission intensity of a fluorescent dye doped or labeled PLLA sample was monitored during a non-isothermal cooling trial.



Objective

Test a proposed fluorescence technique for efficacy in sensing crystallization behavior during non-isothermal crystallization

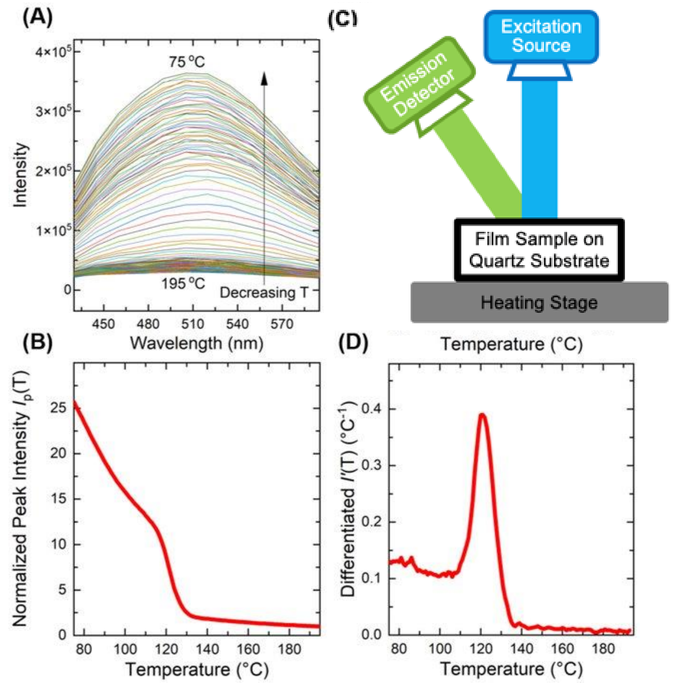
Materials and Methods

- Synthesis of CN-PLLA (labeled)

Characterizations

- X-Ray Diffraction (XRD)
- Differential Scanning Calorimetry (DSC)
- Size Exclusion Chromatography (SEC)

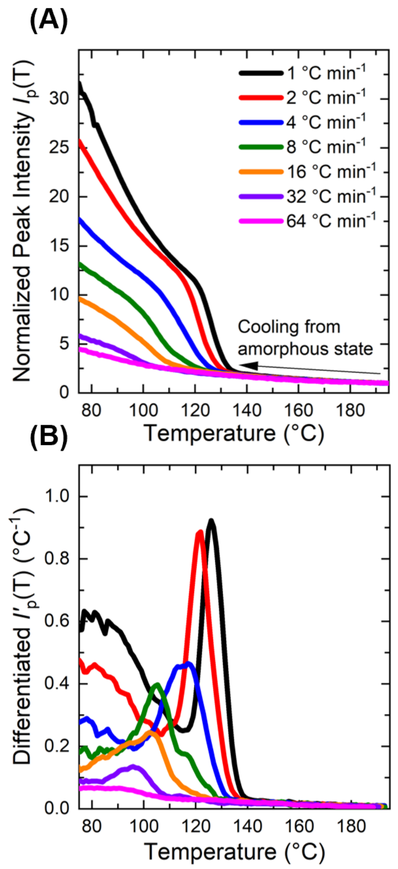
Results

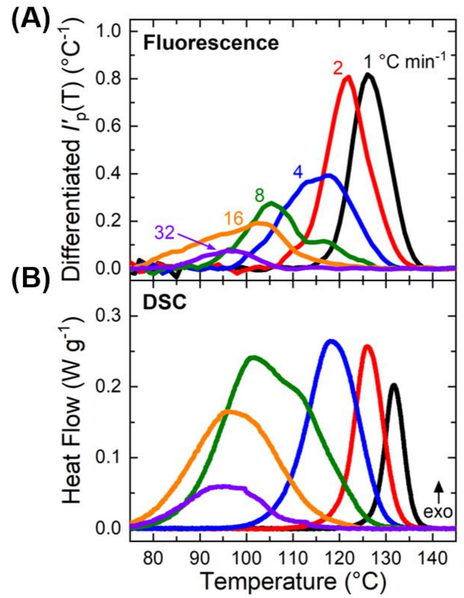


Conclusions

The technique resembled characterization of PLLA through DSC which confirmed the validity of the technique, while maintaining advantages to traditional techniques.

Results





Future Work

Test efficacy of technique in isothermal crystallization, continue to study crystal microstructures, study bilayer films.

Acknowledgements

- Gabriel Nile
- Kailong Jin
- FURI!

FURI

Ira A. Fulton Schools of Engineering
Arizona State University