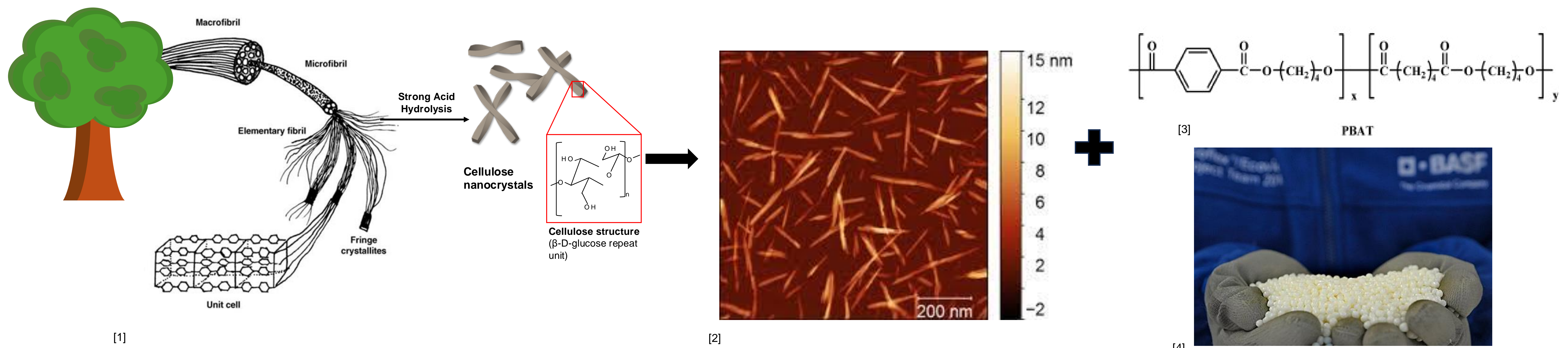




cikramer@student.ubc.ca

Material Background

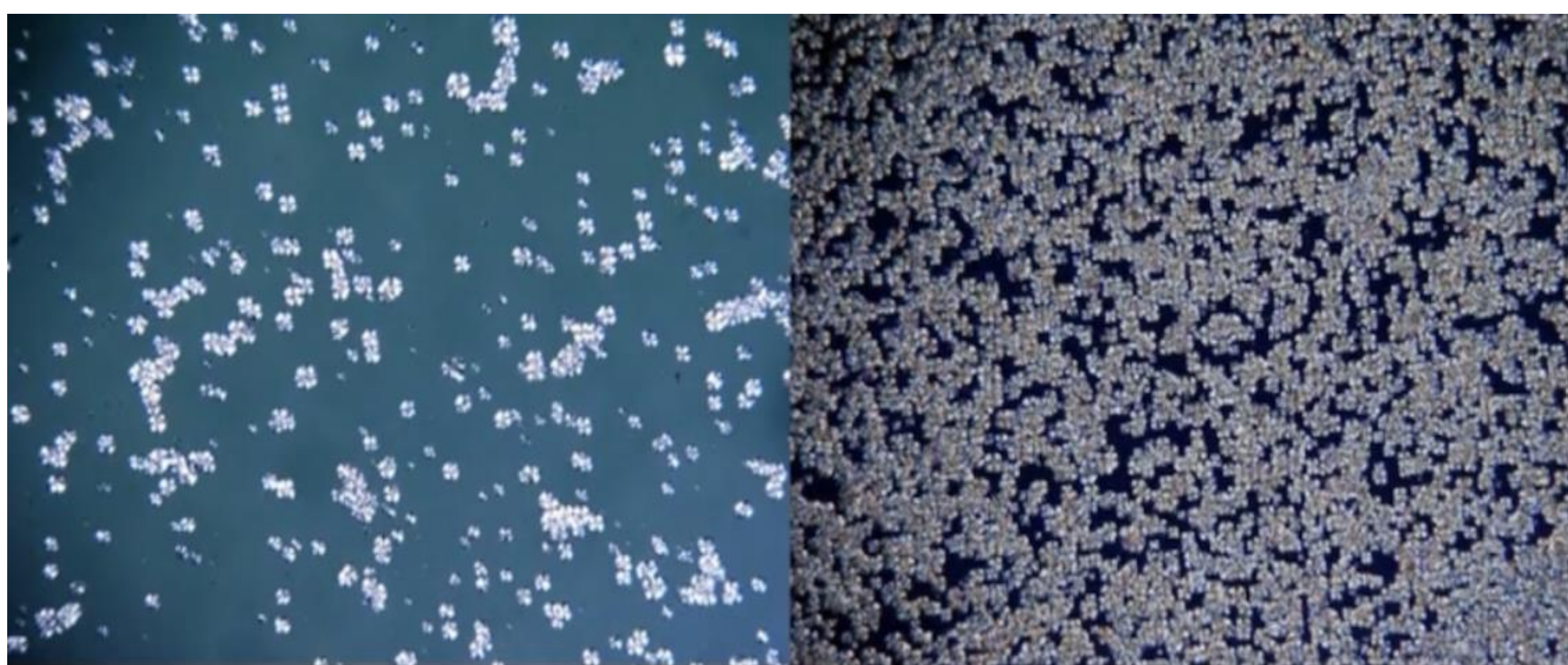


Dextracel Cellulose Nanocrystals are extracted from wood pulp material through a hydrolysis reaction

Ecoflex Polybutylene adipate terephthalate (PBAT) used in pellet form as composite polymer base

Crystallization in Polymers

- Commonly overlooked but very important in many uses of polymer materials
- Crystalline polymer regions are much stronger than amorphous regions
- Fast crystallization rates are necessary for various processing techniques
- Biopolymers currently have very slow crystallization rates, and little is known on the methods by which this can be tuned or controlled



Crystallization in PBAT without CNC additive (left) versus with added CNCs (right) [5]

Objectives

- Further understand the methods in which CNCs can affect properties of polymers when combined in a biocomposite
- Leads to the ability to tune these properties for use of PBAT in a variety of new applications
- PBAT as an alternative to non-biodegradable plastics decreases the environmental impact of single-use packaging



[7]

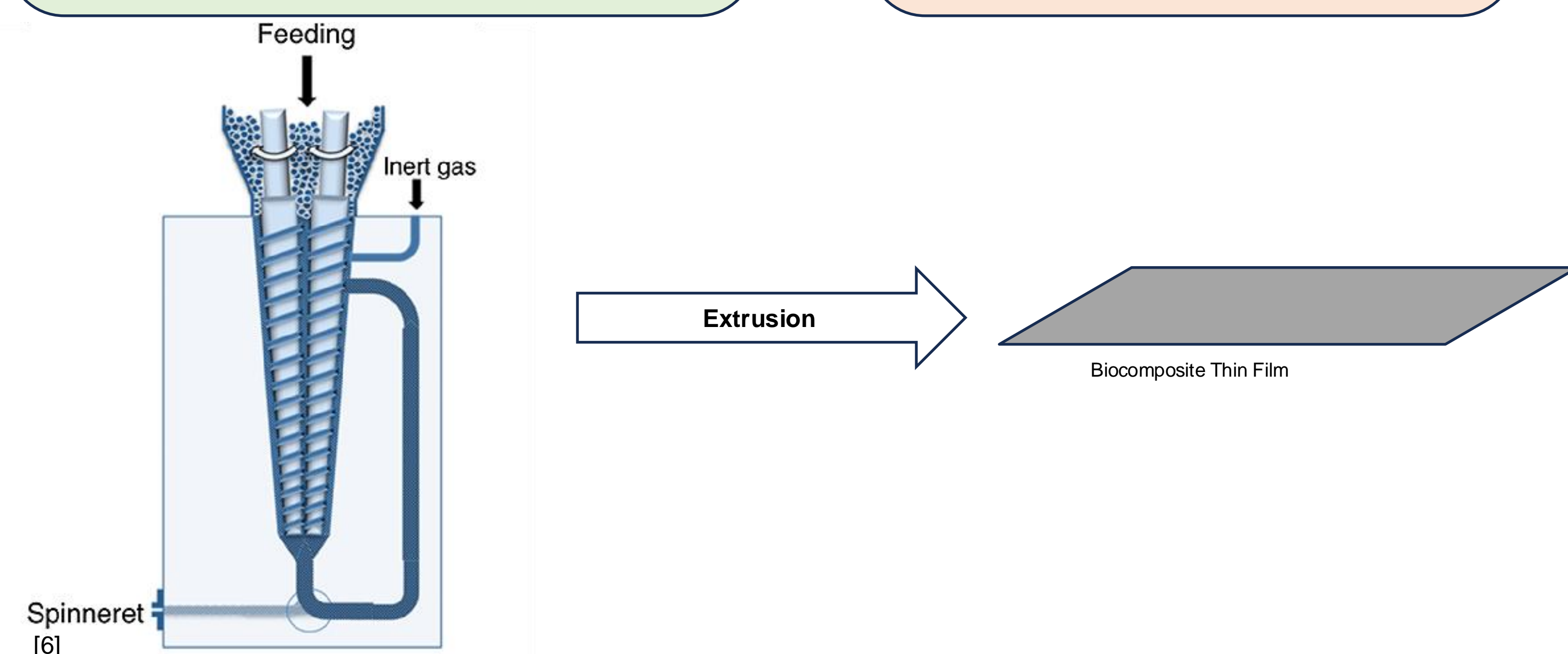
Process and Testing Methods

Process

- Combine CNC with PBAT in weight percents varying from 0.5-5 wt% using dual screw compounder
- Extrude or heat press into thin films of various thicknesses for testing

Testing

- Mechanical Testing
 - Tensile/Instron testing, DSC
- Microscopy
 - Crystallization nucleation rate, AFM



Further Work

- Explore potential nanoparticle leaching from biocomposite thin films
 - Using Carbotrace 680 and various forms of microscopy
 - Data on the leaching behaviors of CNCs will expand the possibility for these composites to be used in food packaging and other consumer good packaging applications

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