

Matthew Yen

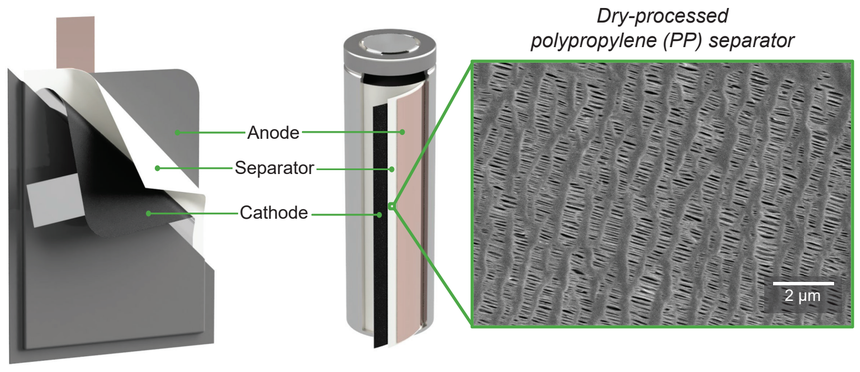
Wahlen Award
Ph.D. Student, Mechanical Engineering
Second Year ARCS Scholar

Georgia Tech

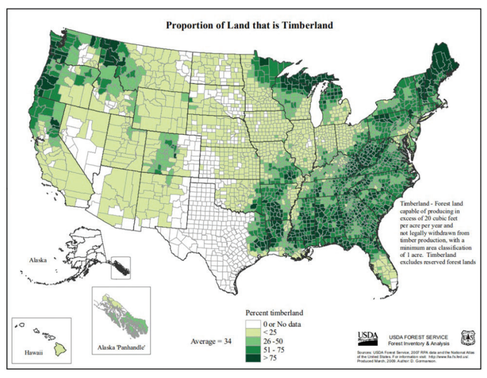
Cellulose Nanofibril Separators for Lithium Batteries

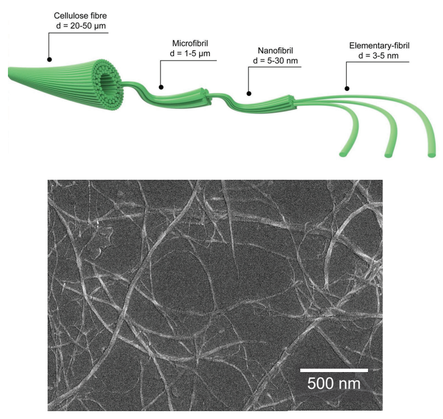
Engineering non-woven membranes from nanoscale cellulose to replace conventional plastic separators, enchancing battery performance, safety, and sustainability.

Role of the battery separator



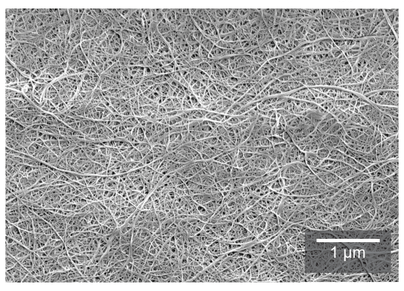
Cellulose nanofibrils (CNFs)

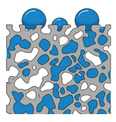
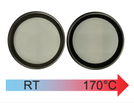




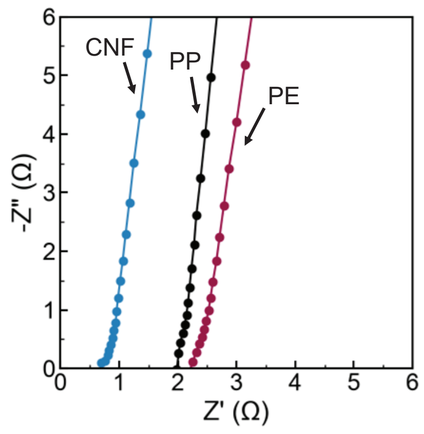
CNF-based separators

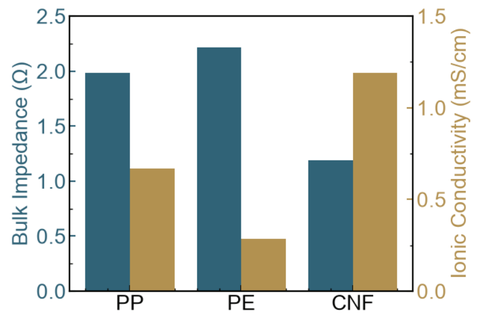
CNF separator surface morphology



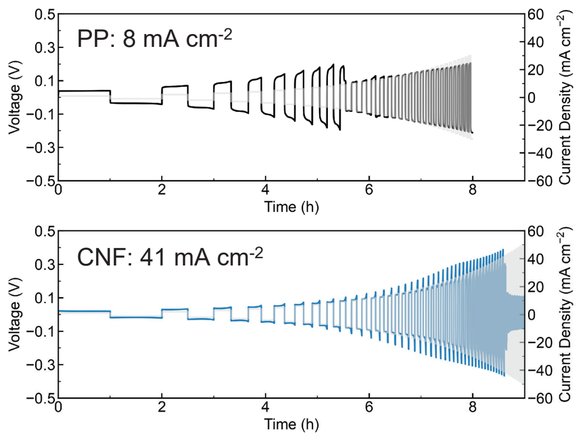
	Polyolefin	Cellulose
Renewable	X	✓
Wettability	Poor	Excellent
		
Thermal stability	Low	High
		

Electrochemical Impedance Spectroscopy





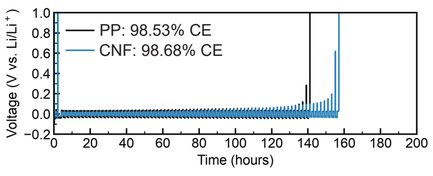
Critical Current Density

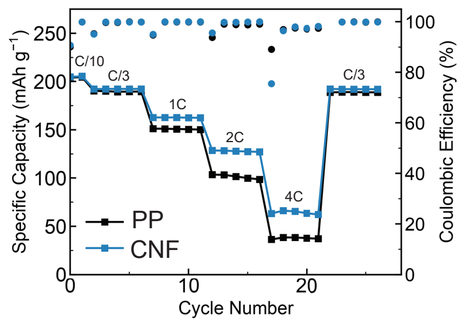


Cycling Performance

- 3 mAh cm-2 NMC811 | 20 µm Li
- Electrolyte: LiFSI-1.2DME-3TTE
- Stack pressure: 100 kPa
- Temperature: 25°C

Li | Cu cells





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