ARISE Week 4

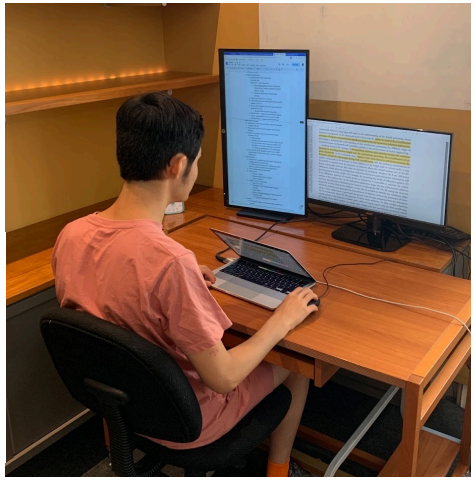
Joel Grayson

What We Did

- Tried Canada Balsam and Polyethylene
- Met Dr. Braulio Rodriguez and student
- Learned about SEM and sputter coating with Dr. Mandal
- Created five new samples of BrDPA-AzoBipy because remelting old ones and creating from old powders was not working
- Took Craic measurements
- Read a five papers on CTCs, organic semiconductors, and additives (thanks Alex) at the Bobst library and at home

Papers read:

Charge-Transfer Complexes in Organic Field-Effect Transistors: Superior Suitability for Surface Doping	Babuji, Adara; Cazorla, Alba; Solano...
Highly Polymorphous Nicotinamide and Isonicotinamide: Solution versus Melt Crystallization	Fellah, Noalle; Zhang, Carolyn Jin; C...
Organic Semiconductors	Khan, Shahed U. M.
Cocrystals Definitions	Lara-Ochoa, F.; Espinosa-PÉRez, G.
Manipulating Crystallization with Molecular Additives	Alexander G. Shtukenberg; Stephani...



BrDPA-AzoBipy with 18.8 wt% Polyethylene Cooling Temperature

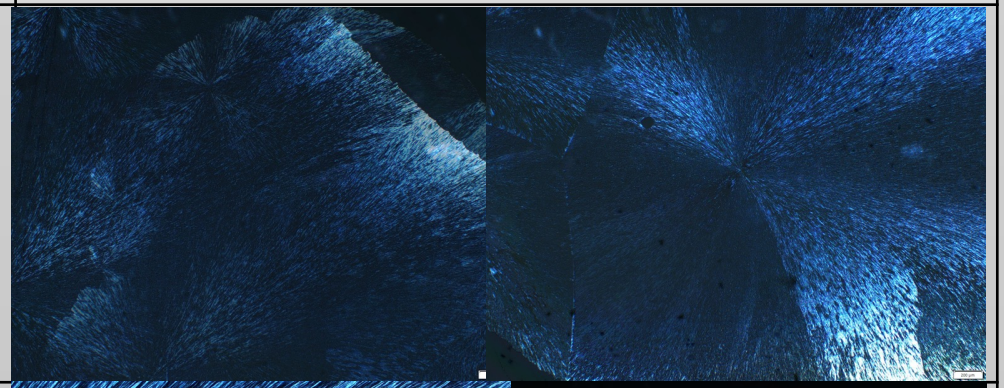
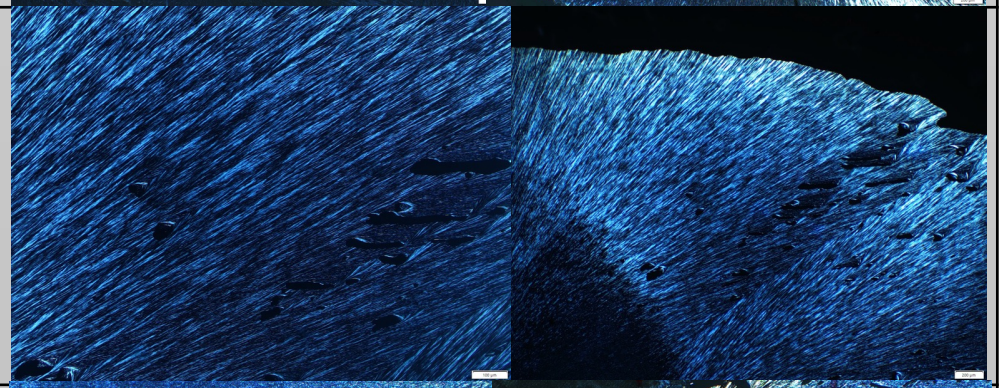
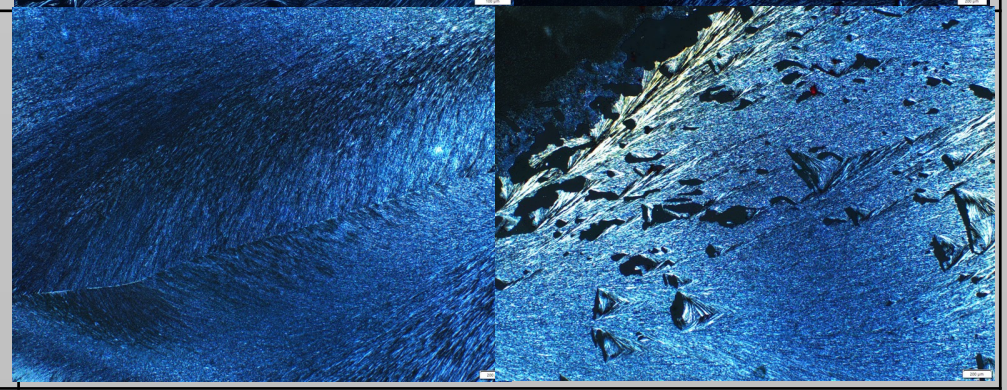
Methodology

Heated at 140° at the melt. Waited for it to cool at varying cooling temperatures. All done on one reused film.

Conclusion

- No twisting
- Polyethylene is not helpful

Results

Cooling Temperature	Photos
50°	
70°	
90°	

BrDPA-AzoBipy with 10 wt% Canada Balsam

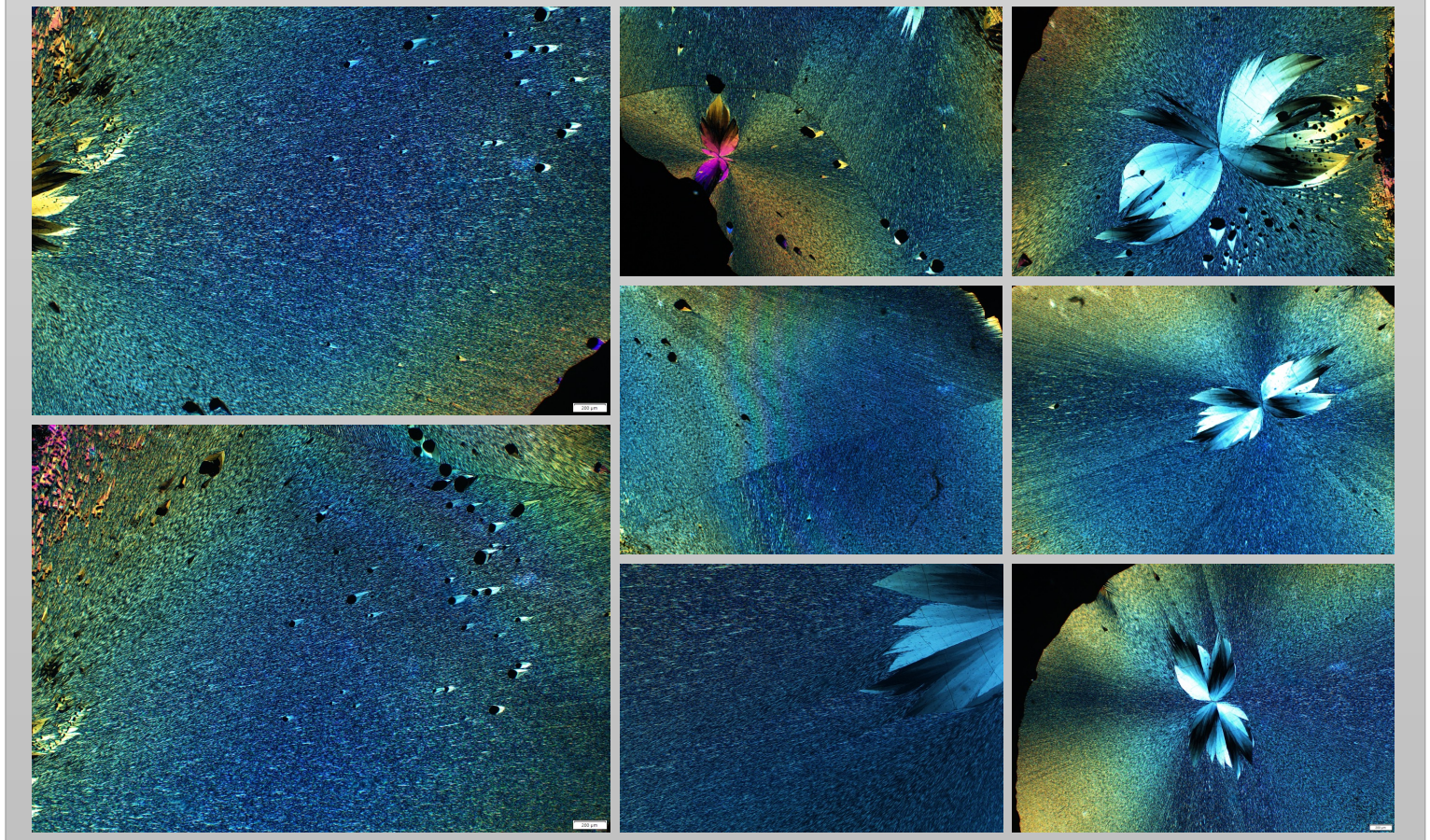
Methodology

Heated at 140° at the melt. Cooled at 70°. All done on one reused film.

Conclusion

- No twisting
- Canada Balsam is not helpful

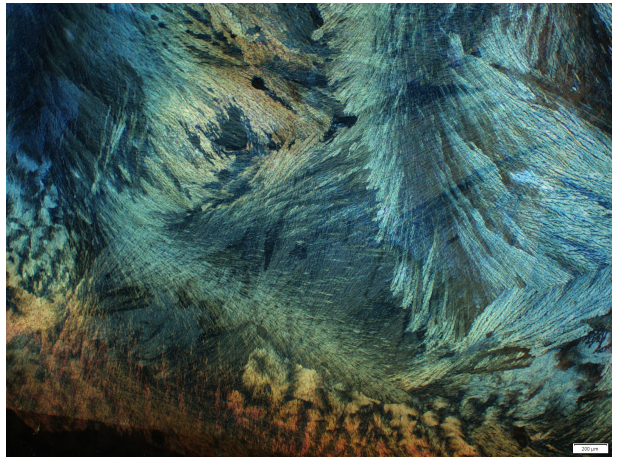
Results



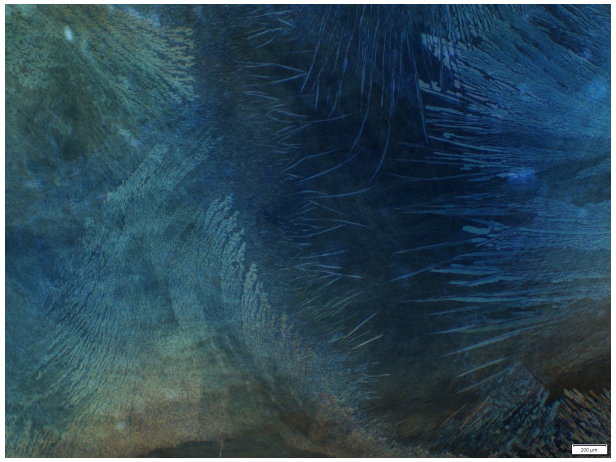
Weird Results with old Damar Gum

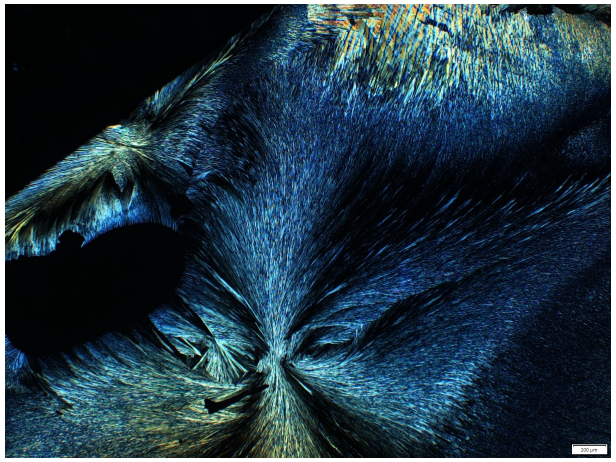
When creating new BrDPA-AzoBipy with 8.9 wt% damar gum films from powder or by remelting, the results were no longer twisting.

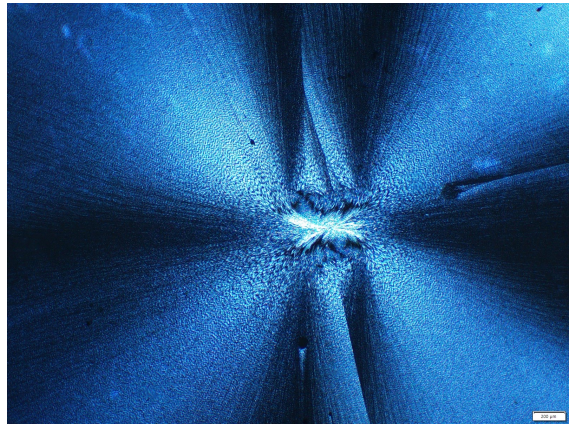
Film 1



Film 2



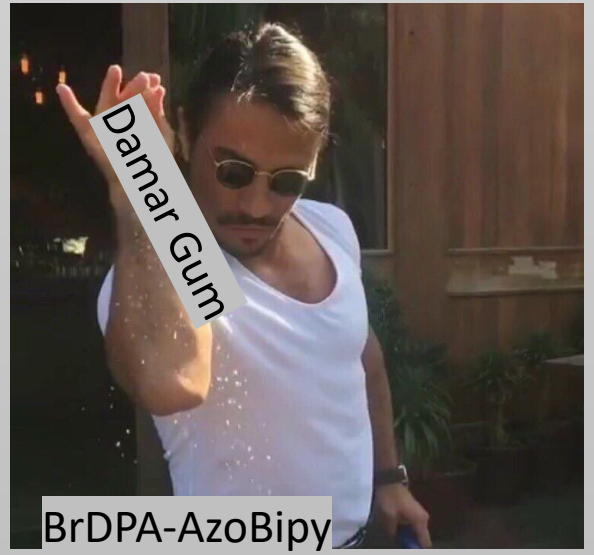




Formerly looked like this

New BrDPA-AzoBipy with 12 wt% Damar Gum Powder for Samples 1–4

Methodology

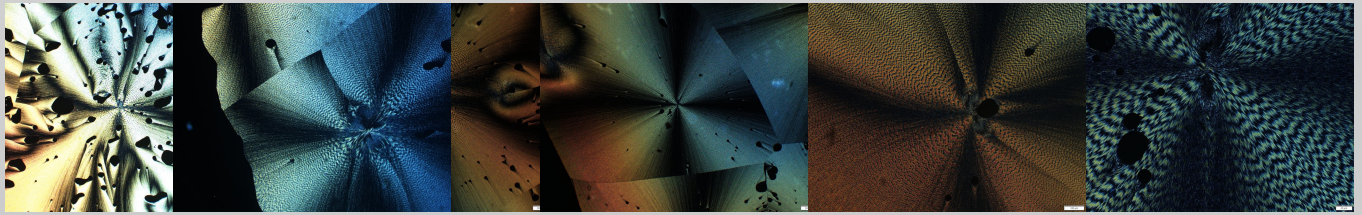


Conclusion

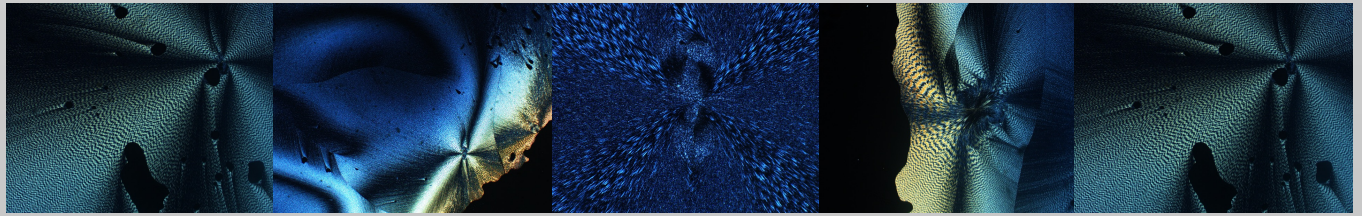
Mixed new powders solved the problem, showing that powders may expire. Alternatively, it could have just been because the earlier powders were not mixed properly.

Results

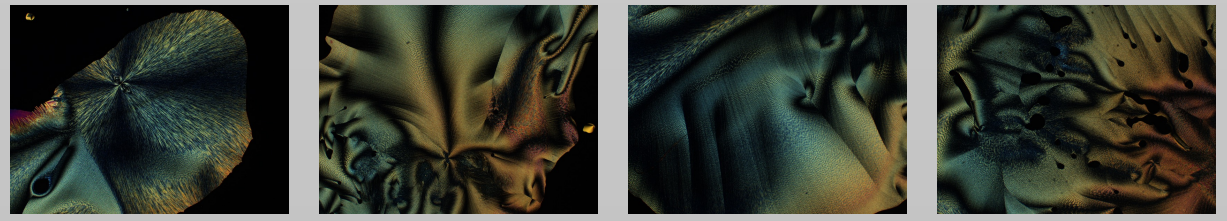
Sample 1



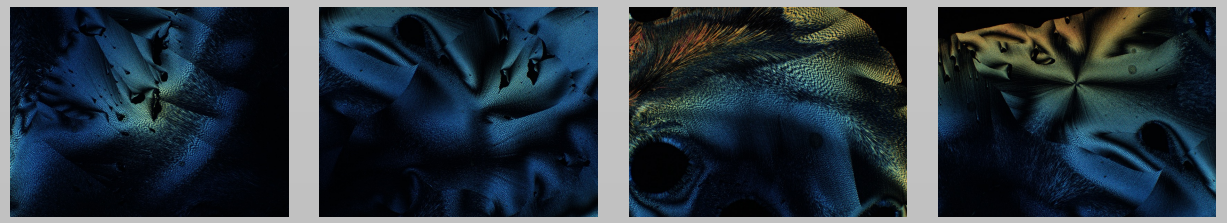
Sample 2



Sample 3

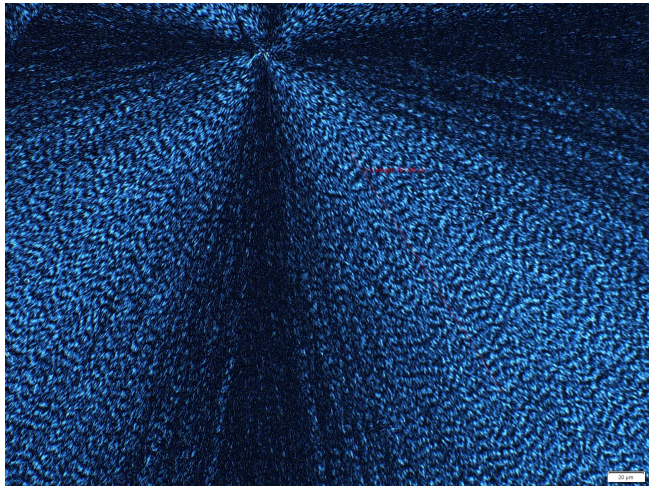


Sample 4

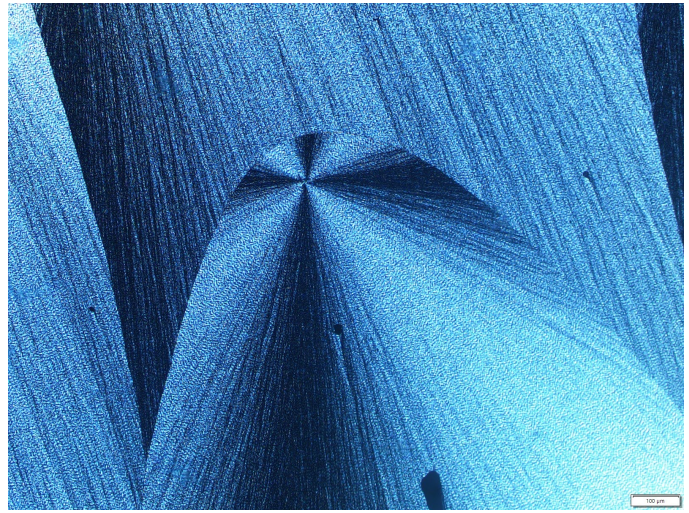


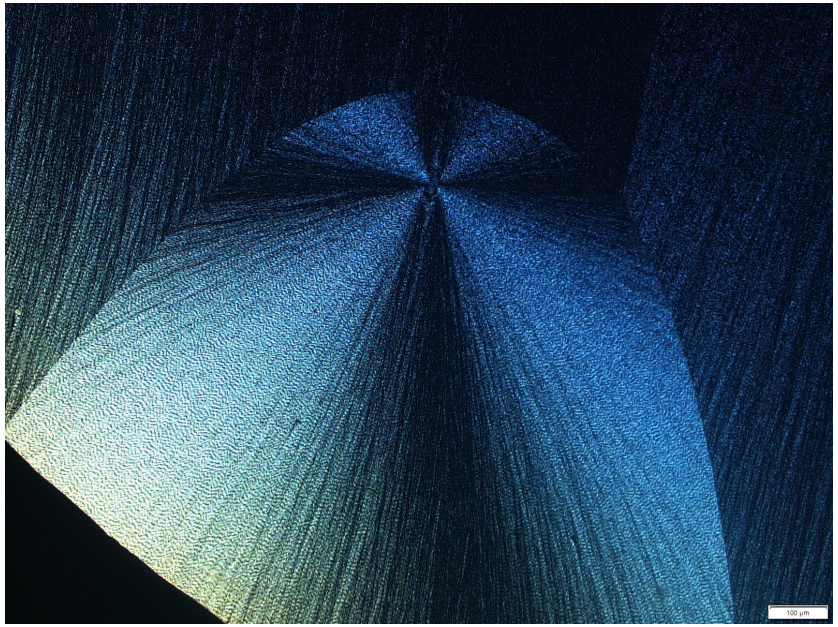
New BrDPA-AzoBipy with 13.6 wt% Damar Gum Powder for Sample 5

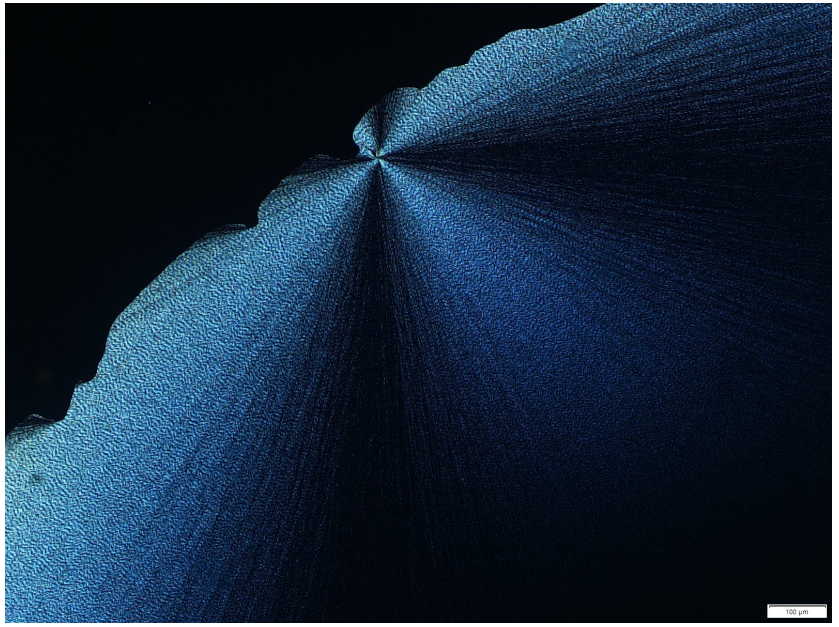
21 periods for 161 μm = 3 μm pitch



↑ zoomed in ↑



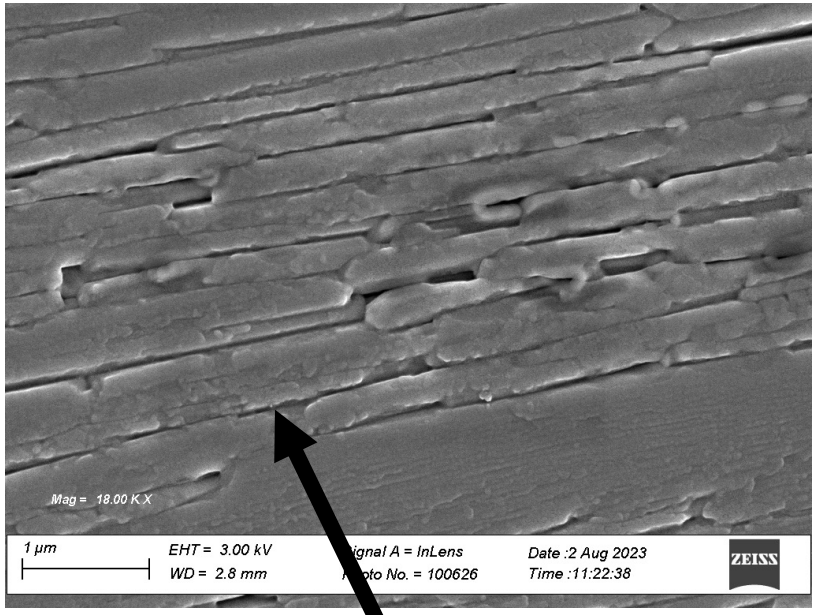




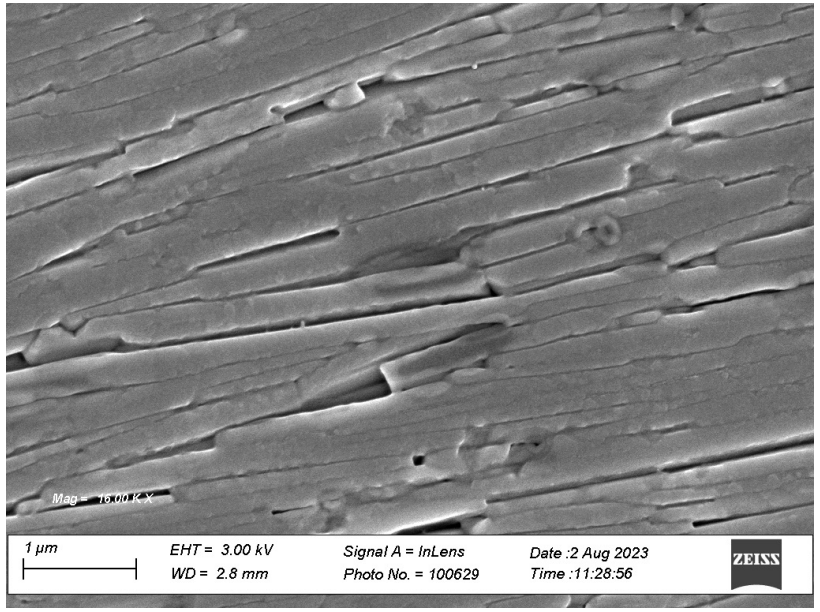
Confirmed my earlier conclusion that TM 140°, TM 70°, and no pressure is best for (beautiful) twisting.

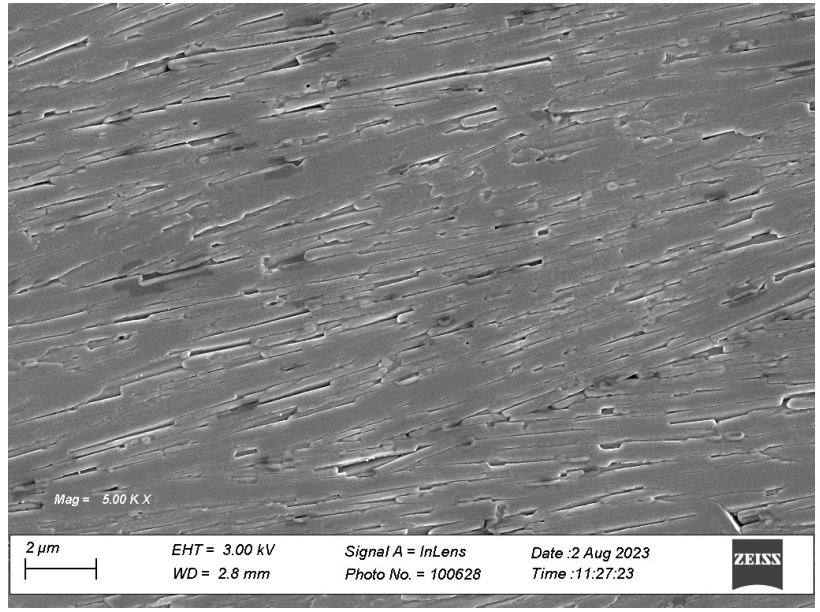
Scanning Electron Microscopy with Dr. Mandal

- SEM on sample 1 (12 wt% damar gum)
- Used iridium for a higher resolution
- Dark spots caused by melting because of the electrons



Fibers

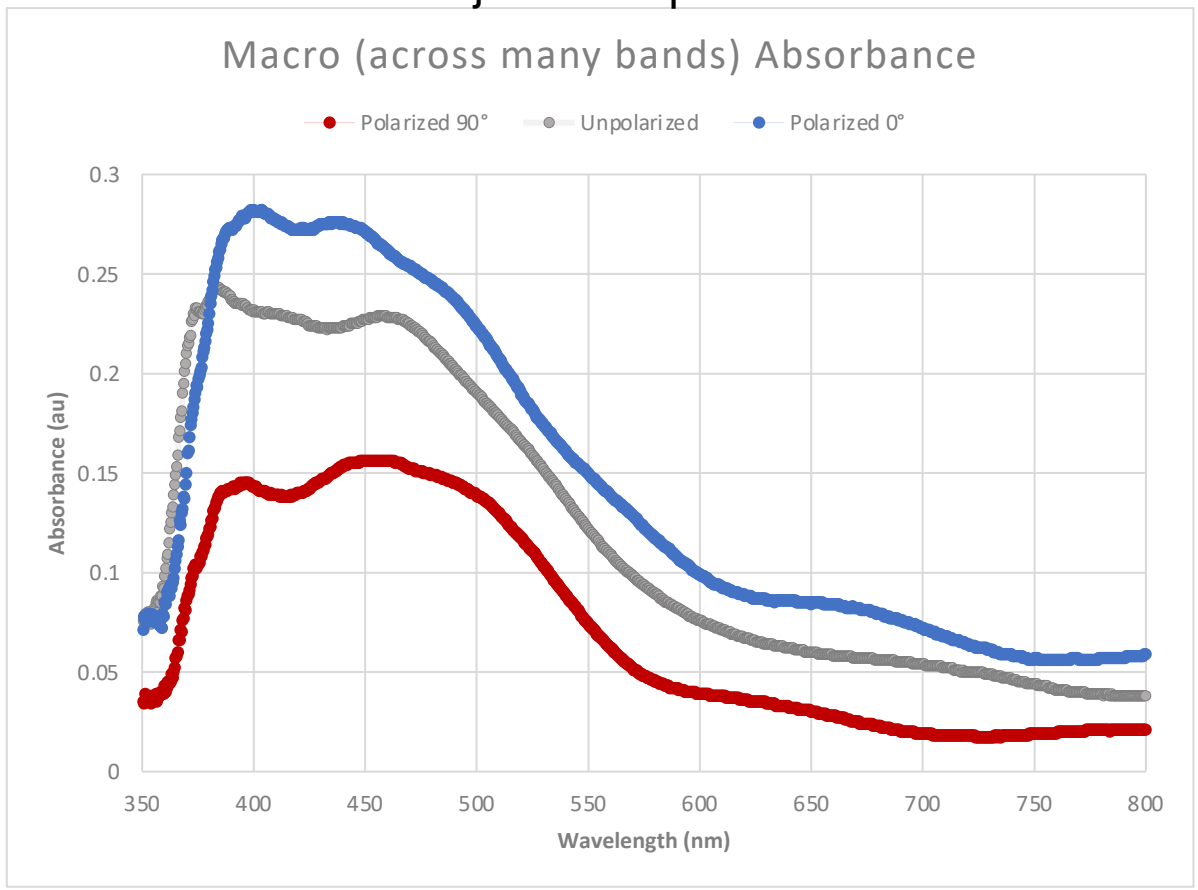




Microspectroscopy from the Craic (3 attempts)

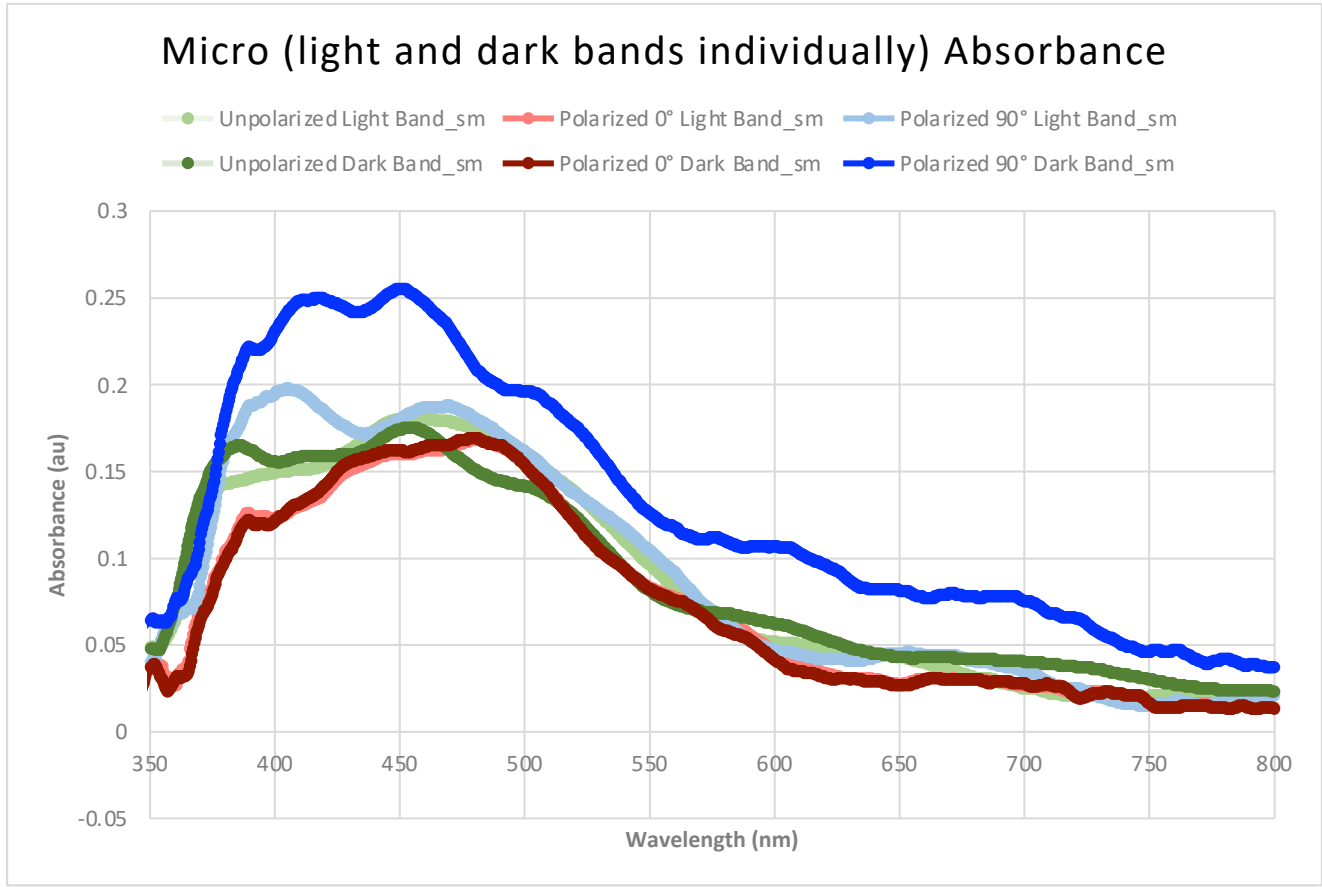
Sample 5

10x objective. Aperture 2.



Smoothed

40x objective. Aperture 5.



This Week

- Make devices with Mia (Tuesday)
- Work on lab report (by Thursday night)
- Film video in lab (Tuesday)
- Create poster (Wednesday and Thursday)