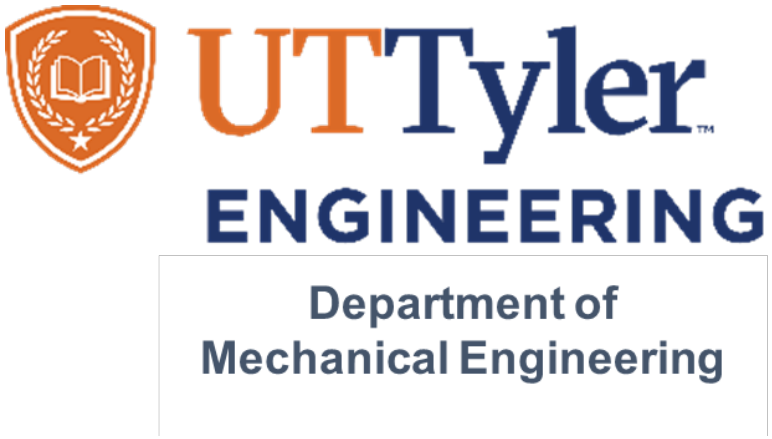

MENG 5347
Polymer Science and Engineering

Wk.1 Syllabus

Dr. Shih-Feng Chou
Office: RBN 3005
Email: schou@uttyler.edu

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Catalog Description

- Introduction to polymer science and engineering, including polymer synthesis, microstructure, characterization methods, mechanical and rheological properties of polymers, and the applications of polymers in nanotechnology and bioengineering.
- Prerequisites: MENG 3319 – Materials Science and Manufacturing, or Graduate Standing.

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Learning Outcomes

1. Describe types of polymers and their microstructures.
2. Explain polymers synthesis methods.
3. Explain characterization methods in polymers and the corresponding properties.
4. Describe the use of polymers in nanotechnology and bioengineering.
5. Produce a draft of a publishable level paper that demonstrates the scientific understanding of polymers in engineering applications.

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Instructor and Text(s)

Instructor Information:	Dr. Shih-Feng Chou, Ronald D. Brazzel Associate Professor 3900 University Blvd., Tyler TX. 75799 Office: RBN 3005 Office Hours: TuTh 10 – 11 AM, We 1 − 2 PM, or by appointment Phone: 903-566-6209 Email: schou@uttyler.edu or Canvas (preferred)
Optional Text(s):	(1) Introduction to Polymers, 3rd edition, R.J. Young and P.A. Lovell, CRC Press, ISBN: 978-0-84933-929-5. (2) Principles of Polymer Systems, 6th edition, F. Rodriguez. C. Cohen, C.K. Ober, L.A. Archer, CRC Press, ISBN: 978-1-48222-387-3.
Supplementary:	Lecture Handout

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Grading

1.	In-class Quizzes	10%
2.	Homework	30%
3.	2 Exams	40%
4.	Project Presentation	10%
5.	Written Report	10%

Exam#1	5:00 – 7:45 PM on February 21, 2023
Exam#2	5:00 – 7:45 PM on April 11, 2023
Project Presentation	5:00 – 7:45 PM on April 18, 2023
Final Report	5:00 PM on April 25, 2023

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Assignments

- Quizzes are in-class exercises on Canvas (attendance).
- Homework are calculation problems due in a week.
- Exams are in-person, open-book, open-note, open-source assignments with specified dates.
- The individual semester project consists of a formal project presentation and a technical written report on literature review of a specific polymer based on the student's thesis and/or interest.

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Assignments

- No makeup or late submission of assignments.
- Any academic dishonesty is an offense and will follow rules set by Department of Student Conduct and Intervention at UT Tyler. Information can be found at: https://www.uttyler.edu/sci/
- Unauthorized collaboration (cheating) means collaborating with or seeking aid from another student during a test or other assignment without authority.

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Assignments

- All assignments must be submitted to Canvas for a grade. Chou class policy: A submission trades for a grade on Canvas. (No email submissions.)
- Only under circumstances approved by the instructor will late submission be considered (plain text email me).
- It is student's responsibility to check the submission of their assignments prior to the deadlines.
- The instructor will ***not*** reply to email submissions, and emails with assignments as attachments will be deleted.

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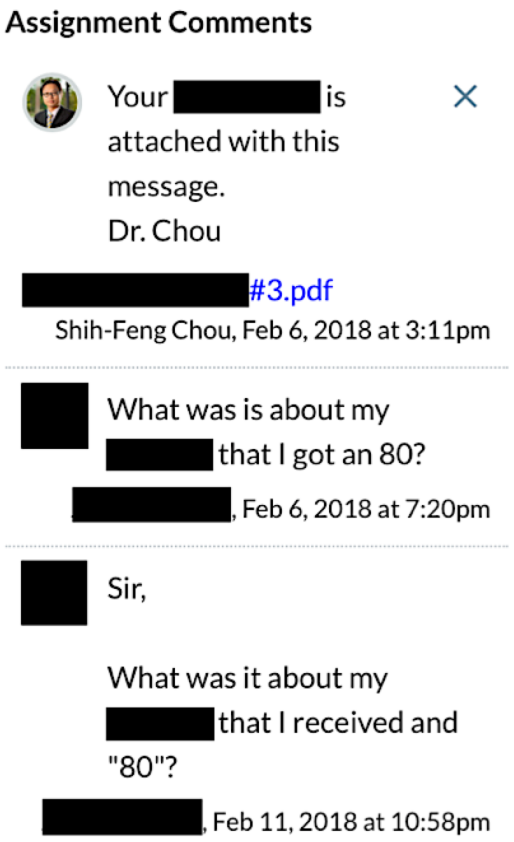
Assignments

- Assignment grading is done via Canvas.
- The instructor will not respond to student's questions or requests in the Assignment Commnets section on Canvas.
- Email request (plain text) to the instructor is the fastest way to get a response.



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Course Plan

Week	Date	Topics	Assignments
1	1/10	Lec#1: Syllabus and Introduction	
2	1/17	Lec#2: Materials Science	HW#1
3	1/24	Lec#3: Polymer Structures	HW#2
4	1/31	Lec#4: Polymer Systems	
5	2/7	Lec#5: Step Polymerization	HW#3
6	2/14	Lec#6: Radical Polymerization	
7	2/21	**1st Exam (Wk.1 – Wk.4)**	**Exam#1**
8	2/28	Lec#7: Characterizations of Polymers	
9	3/7	Lec#8: Rheological Properties	HW#4
10	3/14	**Spring Break – No Class**	
11	3/21	Lec#9: Mechanical Properties I	HW#5
12	3/28	Lec#10: Mechanical Properties II	HW#6
13	4/4	Lec#11: Polymer Applications	
14	4/11	**2nd Exam (Wk.6 – Wk.8)**	**Exam#2**
15	4/18	**Project Presentation**	**Presentation**
16	4/25	**Final Report**	**Report**

(Dr. Chou reserves the right to change schedule in course plan.)

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Classroom Policies

- No food/drink in the classroom.
- Silent your cell phones and electronic devices.
- If you have questions, raise your hand and ask.
- Person who violates or interrupts others in learning will be given a warning and further asked to leave the classroom if the behavior is not changing.
- Check course syllabus for other University Policies.

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Polymers S22 ME Survey

If you could pass on any comments/advice to someone taking the course next year, what would you suggest? (n = 12)

(1) Experiment included.

(2) Read on the subjects that will be discussed in class before hand to be able to understand and discuss the subject during lecture. That way, you know what questions to ask.

(3) NA.

(4) Start the project as soon as possible and visit Dr. Chou's office hours regularly to discuss class topics, project progress, and get feedback on the exams/quizzes.

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Polymers S22 ME Survey

(5) I would definitely ask them to do some individual research on polymers individually which will help in understanding the course better.
(6) Don’t hesitate to ask Dr. Chou if you need help in anything.
(7) My suggestion for future course takers would be to take note of the subtle differences between different terminologies used throughout the course and try to grasp the concept of the in-class problems. I am confident that by doing so, you can do well in the exams. Also, it's fine if you get confused at some topics. Please use office hours because Dr. Chou is very helpful, and he makes a great effort in teaching.

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Polymers S22 ME Survey

(8) The student will have to put in the effort to do well. Also, the person must be prepared to make presentations. Above all, always meet the instructor whenever you have an issue with the course.
(9) Yes.
(10) Understand the basic concepts well, ask question no matter how it might sound to you, focus on every calculation exercises and ensure you thoroughly understand them. Visit Dr. Chou if you do not fully get it.
(11) Listen attentively in his class. The secret of getting an 'A' is right there.
(12) Polymer Class is interesting for even industrial background.

Transition Slide

Question time
on syllabus (no break)

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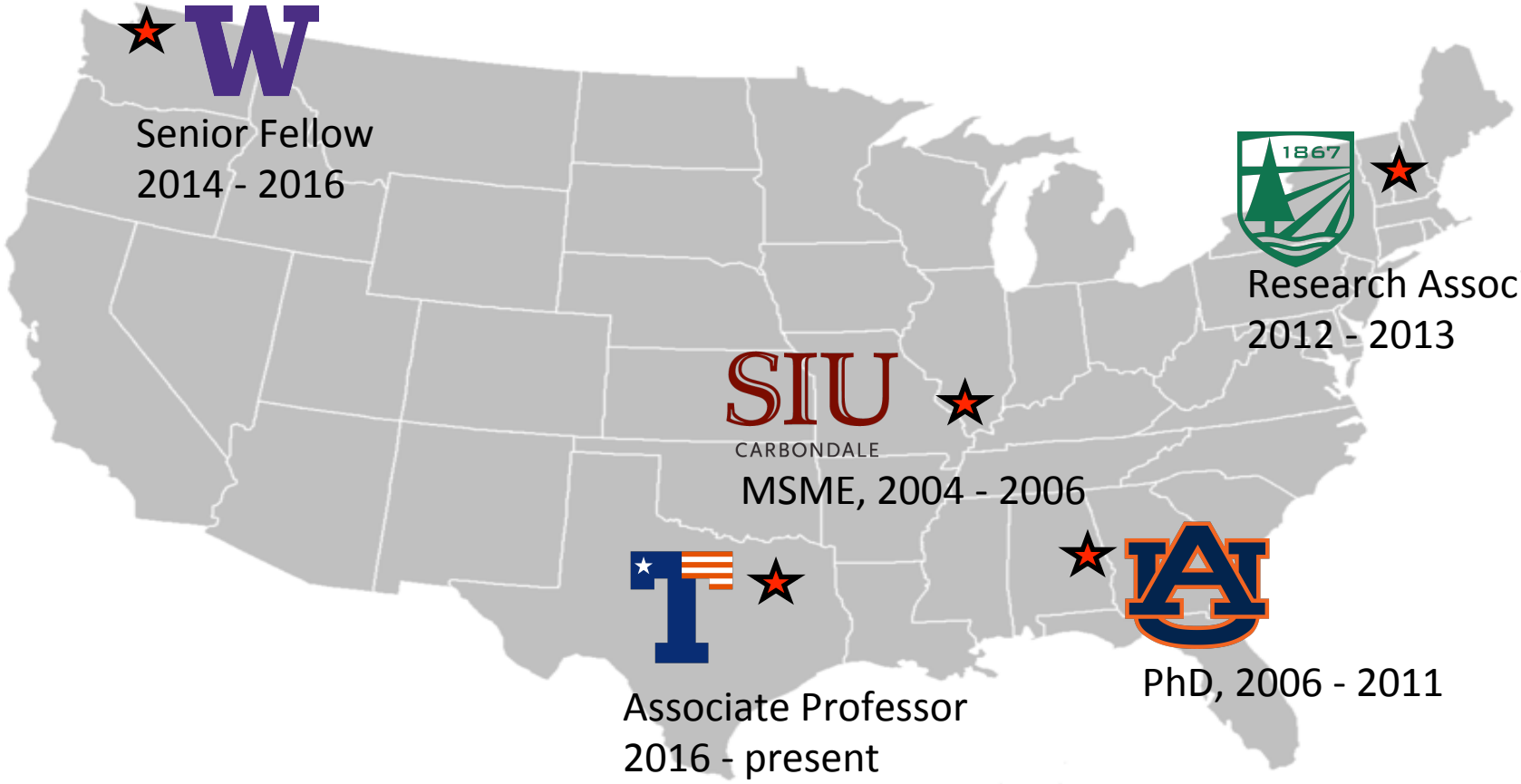
Dr. Chou



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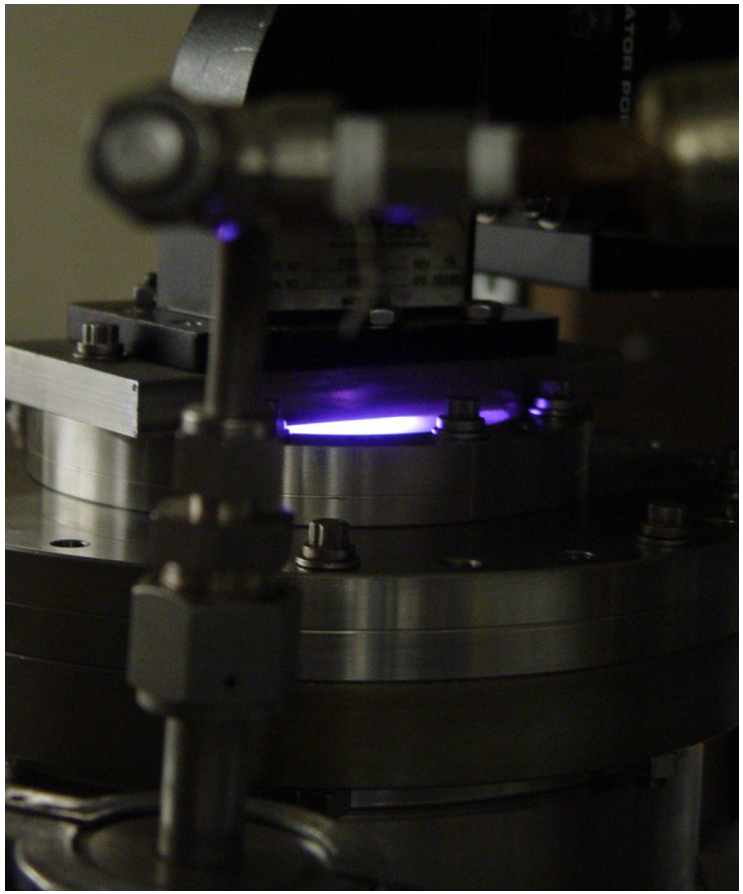
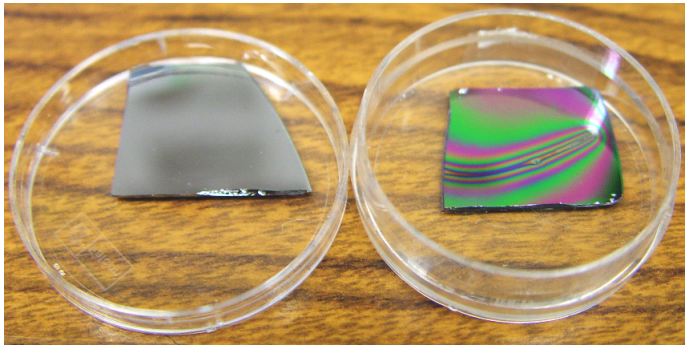
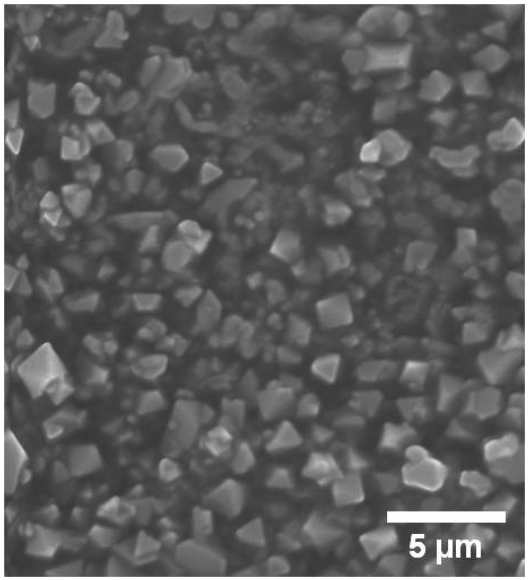
MSME – Diamond Films

SIU CARBONDALE







 Chou SF, (2005), Master Thesis, Southern Illinois University Carbondale.

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PhD – Decomtamination

Gale WF, et al., (2009), *Materials Science and Technology*, 25, pp.76-84.
Chou SF, et al., (2010), *Materials Science and Technology*, 26, pp.66-80.

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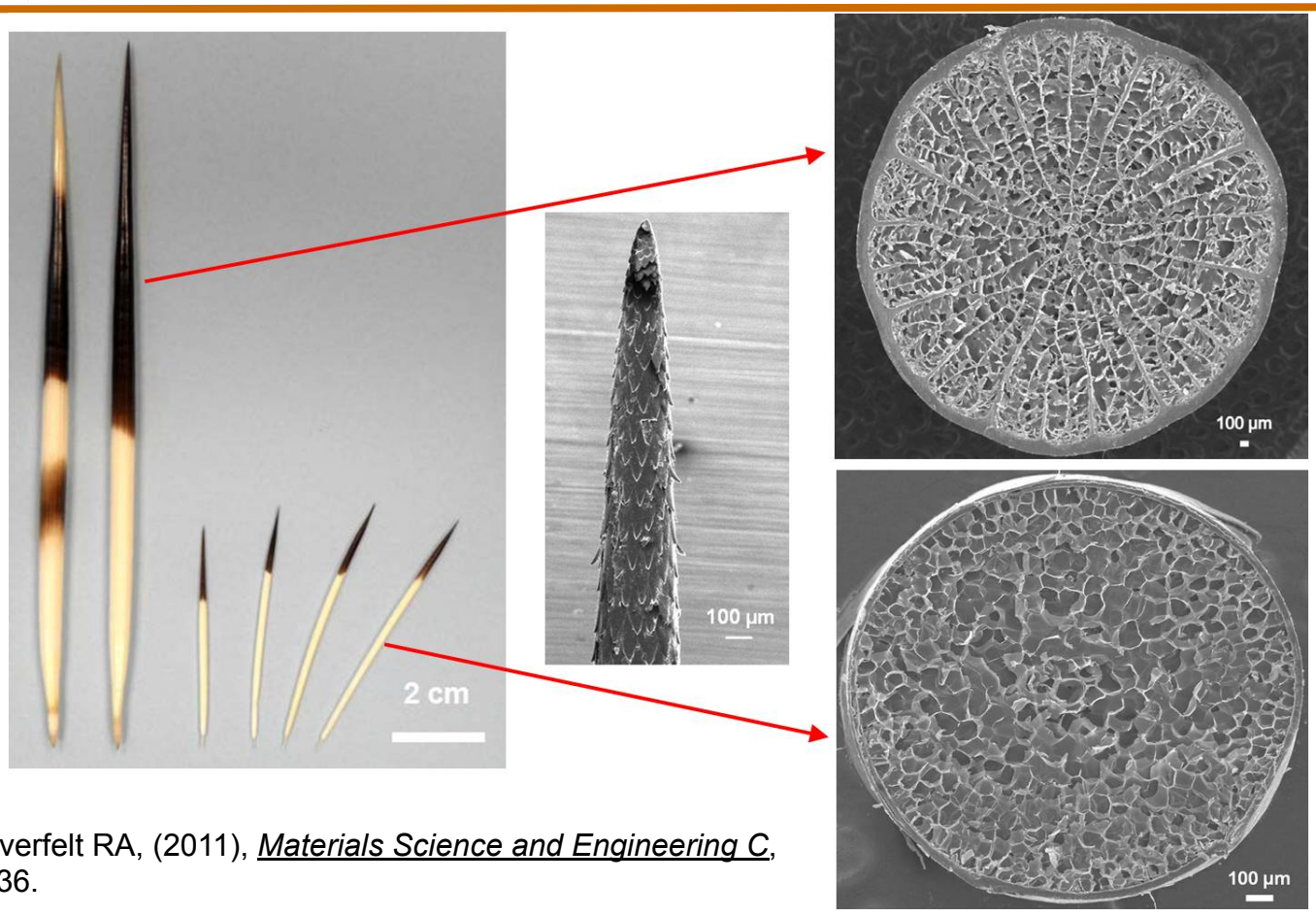
PhD – Keratins



Chou SF and Overfelt RA, (2011), *Materials Science and Engineering C*, 31, pp. 1729-1736.

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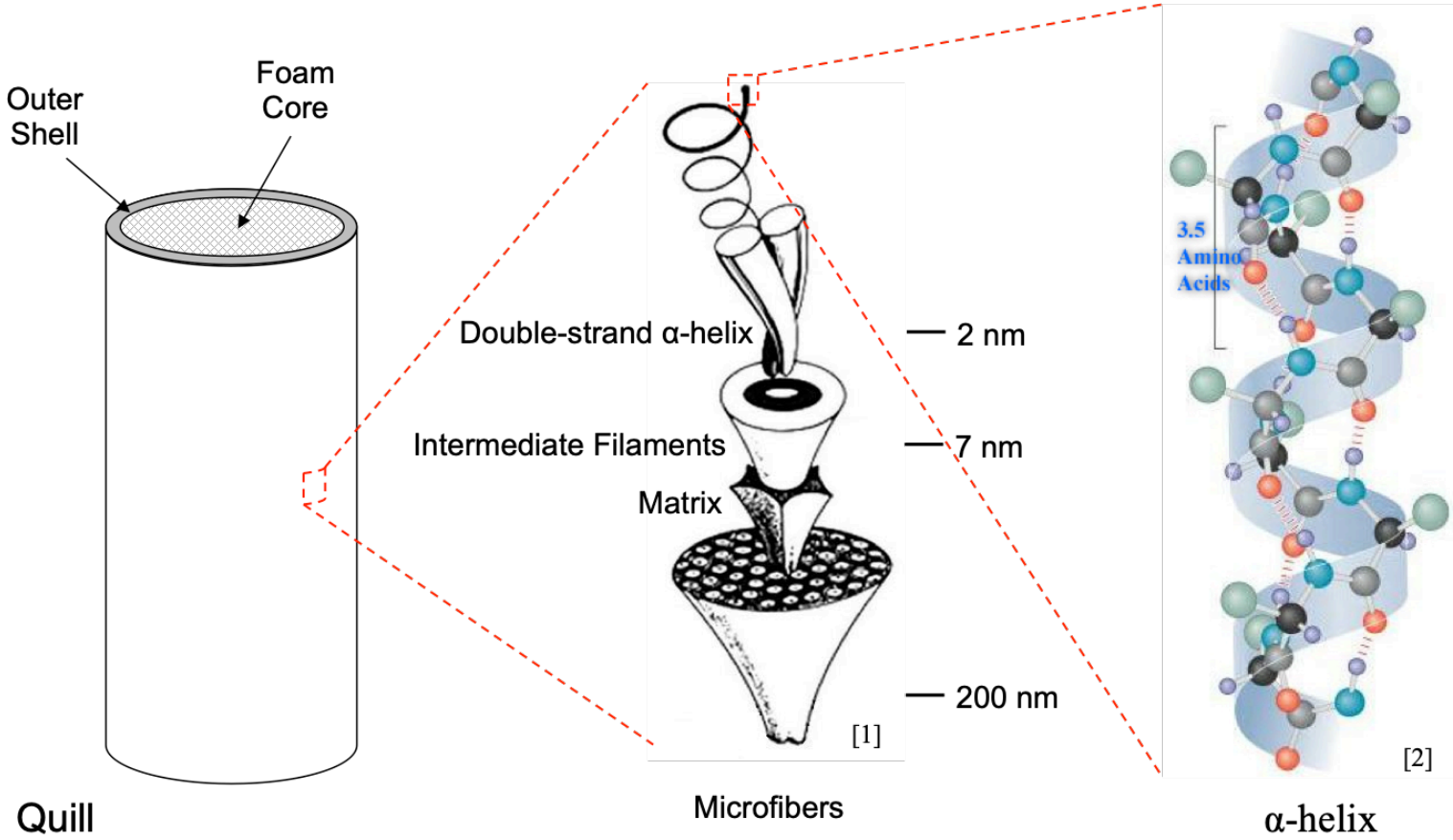
PhD – Keratins



[1] Work of the National Institutes of Health, part of the United States Department of Health and Human Services
[2] Feughelman M: Introduction to the physical properties of wool, hair and other keratin fibres. UNSW Press:1997, p. 1–14.

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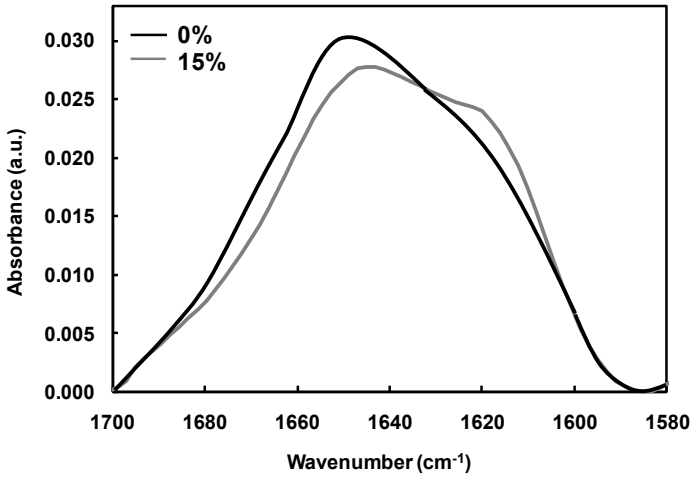
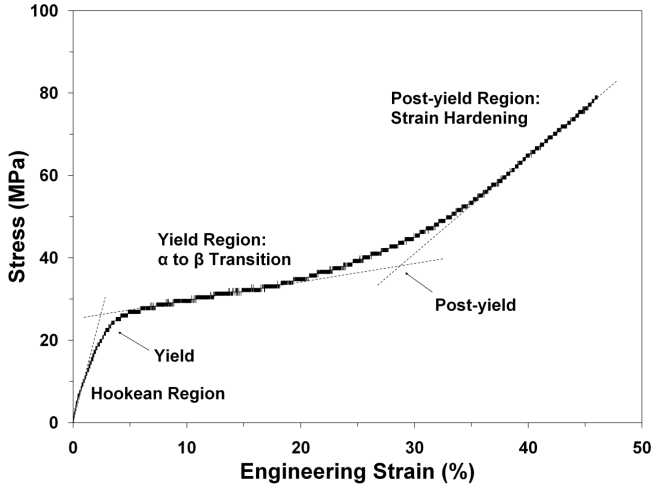
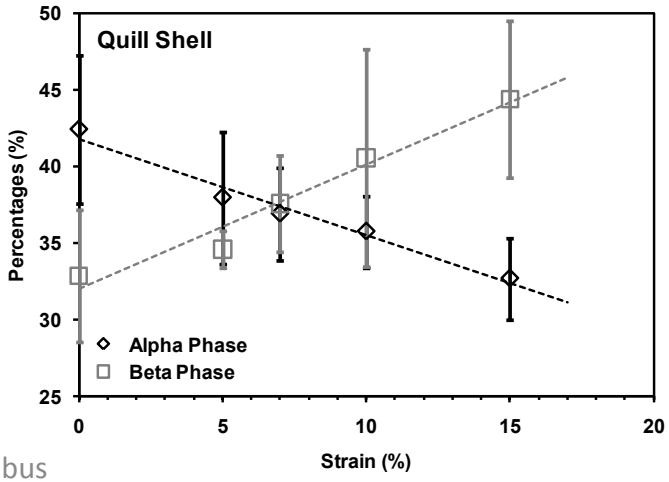
PhD – Keratins







Chou SF, Overfelt RA, Miller ME (2012), *Materials Science and Engineering A*, 557, pp. 36-44.

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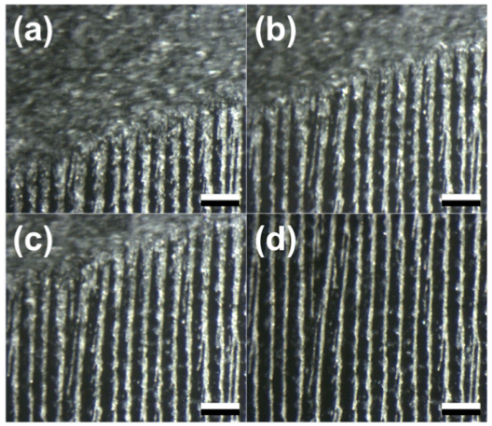
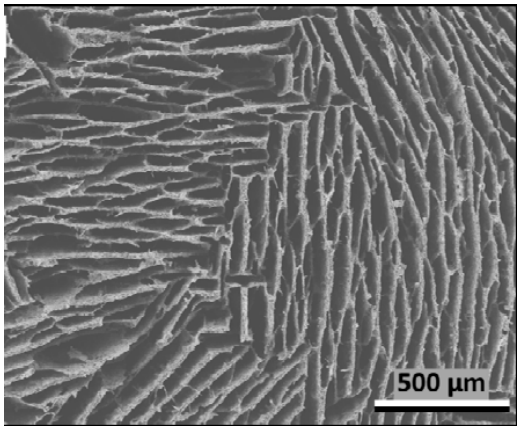
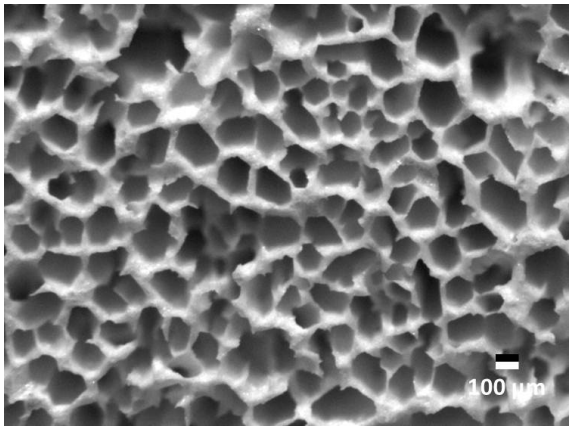
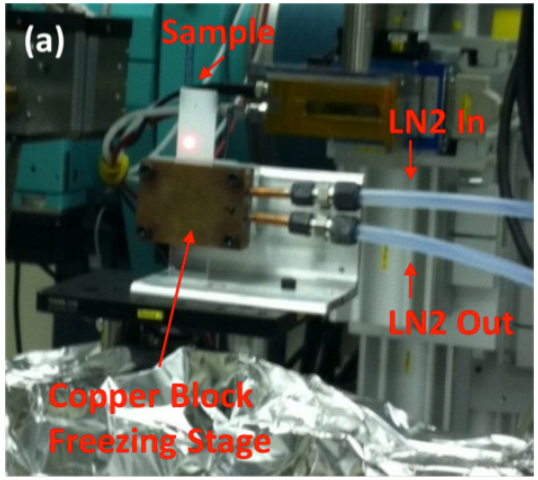
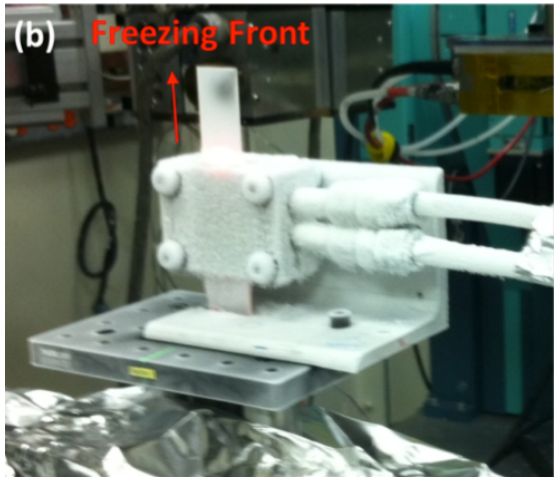
PostDoc – Porous Scaffolds











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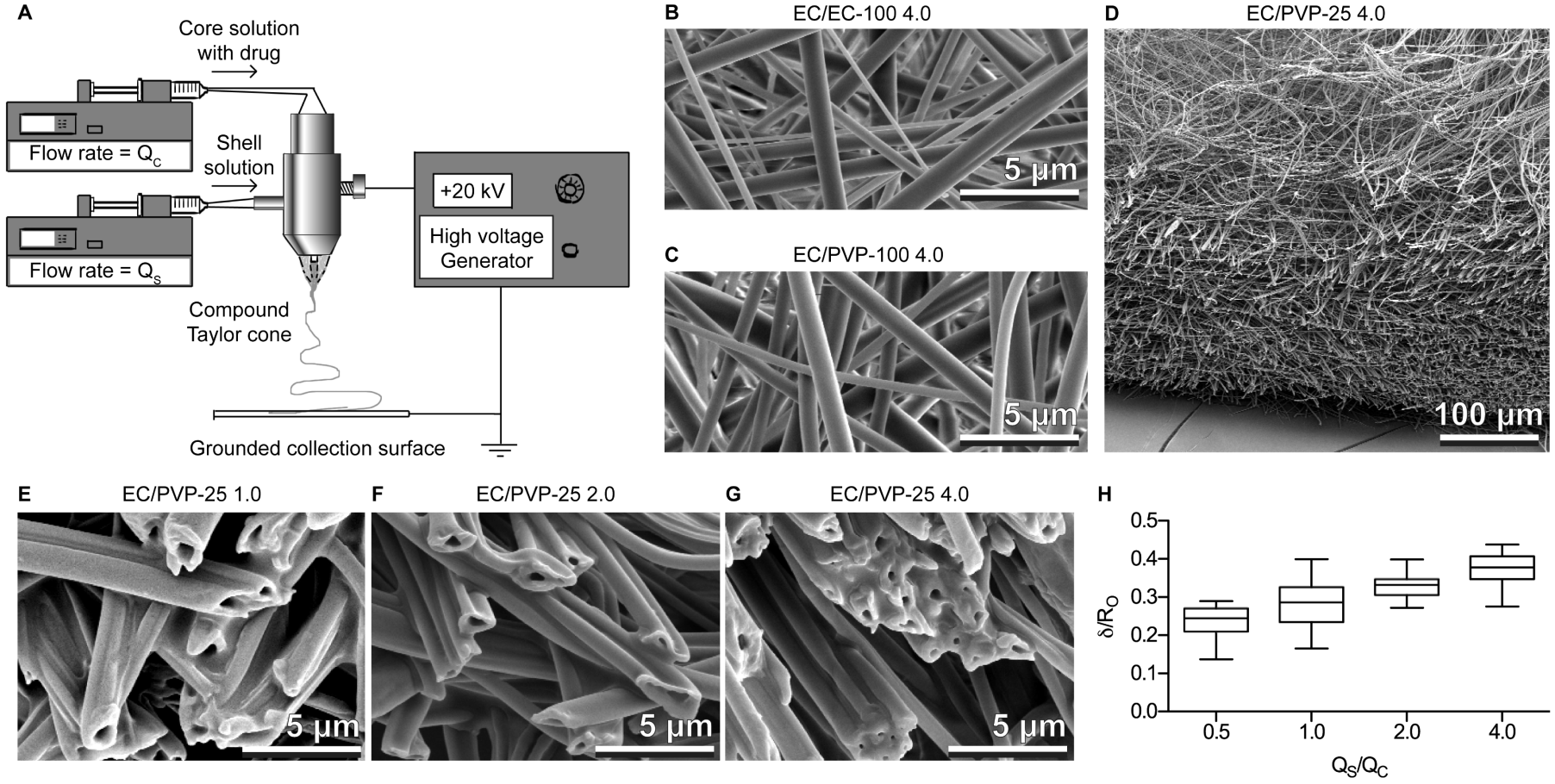
Sr. Fellow – Drug Release



Ball C et al., (2016), *Materials Science and Engingeering C*, 63, pp. 117-124.

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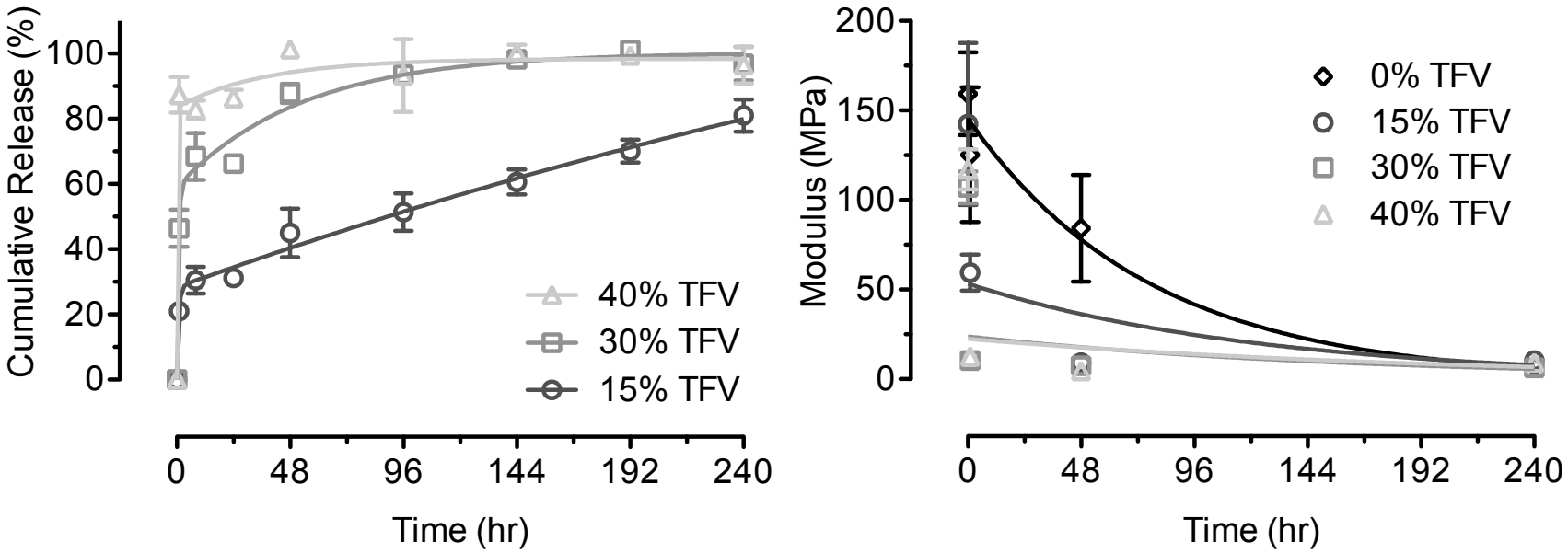
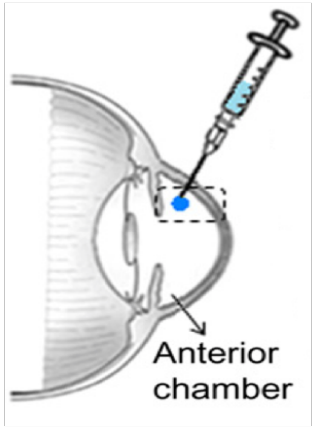
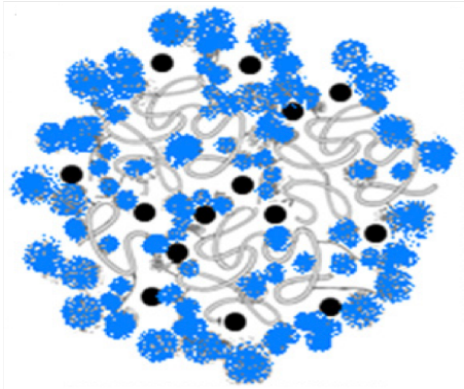
Sr. Fellow – Drug Release

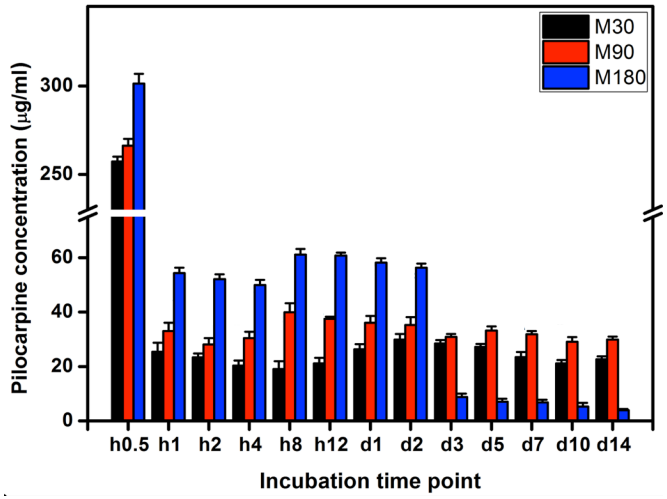


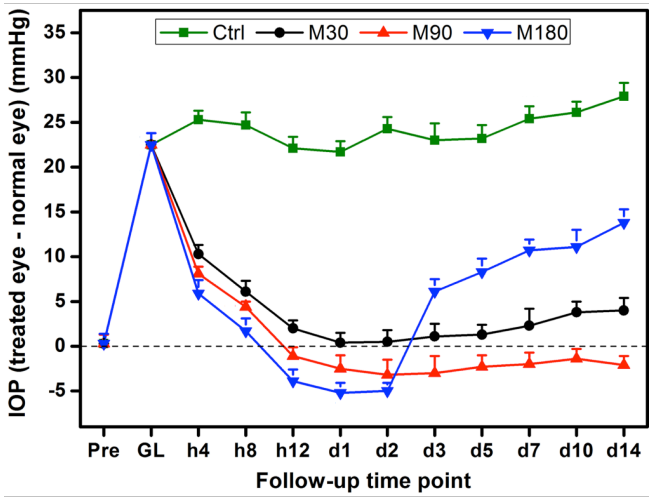
Chou SF et al., (2017), *Journal of the Mechanical Behavior of Biomedical Materials*, 65, pp. 724-733.

Sr. Fellow – Drug Release









Chou SF et al., (2016), *Acta Biomaterialia*, 38, pp. 116-128.

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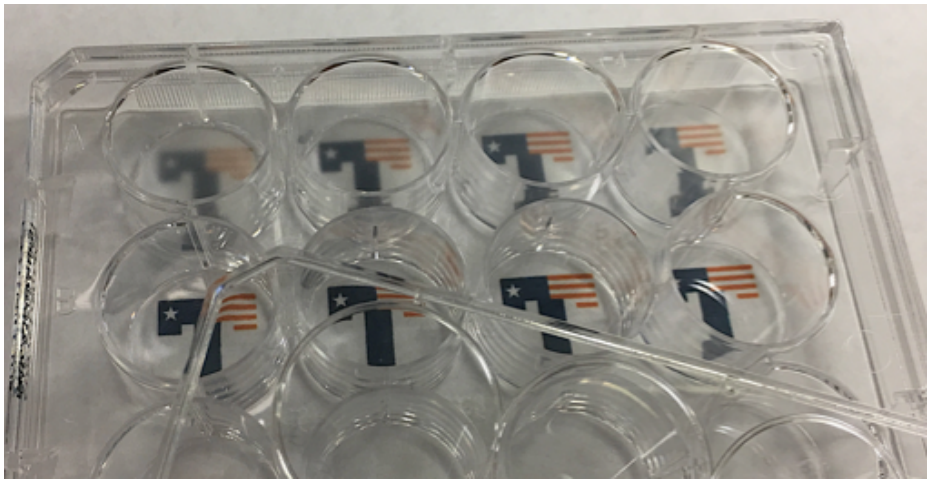
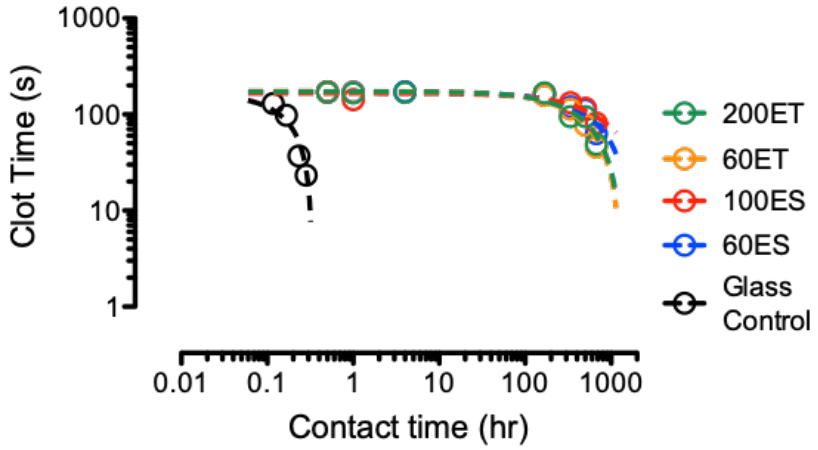
Polymers for Anticoagulation

Thermal and physico-mechanical characterizations of thromboresistant polyurethane films AC Wilson, SF Chou, R Lozano, JY Chen, PF Neuenschwander Bioengineering 6 (3), 69	5	2019
Engineering approaches to prevent blood clotting from medical implants AC Wilson, PF Neuenschwander, SF Chou Archives in biomedical engineering & biotechnology 1 (2)	3	2019





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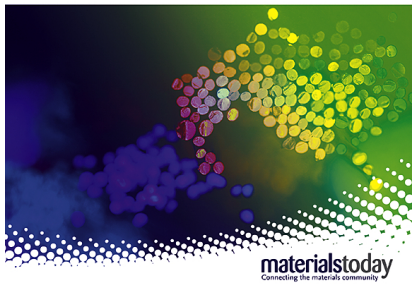
Ploymers for Drug Release

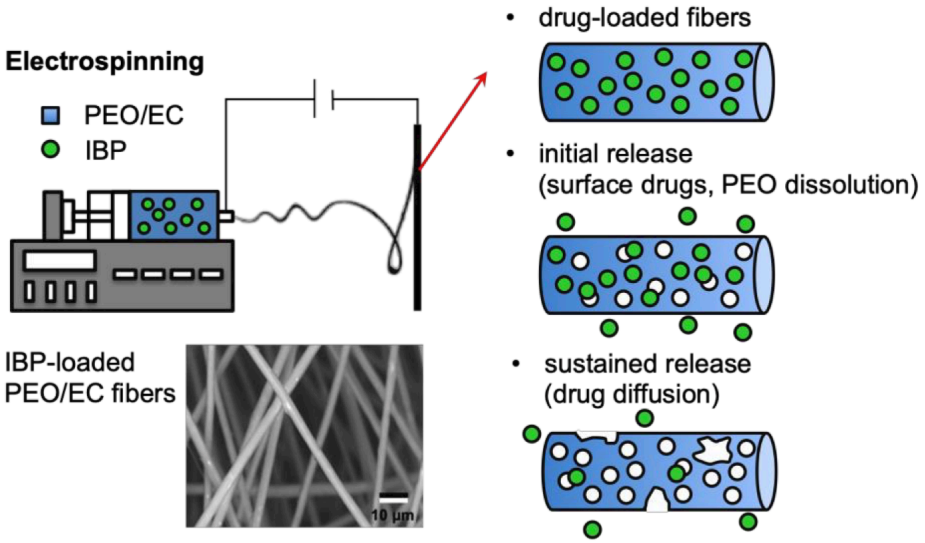


Physicomechanical properties and in vitro release behaviors of electrospun ibuprofen-loaded blend PEO/EC fibers

Billie Cheyenne Hawkins[1§], Eric Burnett[1§], Shih-Feng Chou[1†]

Author Affiliation:
[1]Department of Mechanical Engineering, College of Engineering, The University of Texas at Tyler, Tyler TX, 75799, USA

Graphical Abstract:



Break

Question Time