



Polymer Technology Center

UPCOMING EVENTS

Mark Your Calendars!

Polymer Technology Industrial Consortium-PTIC/Fall Meeting

April 19th - 20th, 2018
College Station, TX
Texas A&M University

Scratch Behavior of Polymers Consortium-SCRATCH

Wednesday, May 9th, 2018
Noon—5pm
After the ANTEC Conference-Orlando, FL



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PTC News &
SPE Student Chapter

Zachry Engineering Education Complex, Engineering Quad Opening Fall 2018



Zachry Engineering Education Complex (ZACH) – Now that major construction is complete, interior finishes are in the works. Walls are being painted, fixtures are being installed, learning technology is being tested and landscaping is beginning. The interior of the Zachry building is bright with lots of natural light, an energetic color palette and glass walls to inspire creativity.

E-Quad – Construction is underway on the E-Quad, a beautiful new green space joining the Zachry Engineering Education Complex, Wisenbaker Engineering Building, Dwight Look Engineering Building and Haynes Engineering Building.

More details: goo.gl/Kjw2Yx



TAMU QUAD—WISENBAKER ADDITION



TAMU QUAD—WISENBAKER ADDITION
BIZZELL ENTRANCE

Did you know:

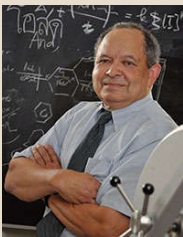
- The Zachry Engineering Education Complex will be the largest academic building on campus with 525,000 square feet.
- The Zachry building will feature a collection of commissioned art based upon engineering and science, including digital, kinetic and sculptural mediums.
- The Engineering Innovation Center (EIC) is expanding when it relocates to the Zachry Engineering Education Complex this fall. It will become the SuSu and Mark '72 Fischer Engineering Design Center and offer students more space and equipment to create and invent.
- The first donation to the Zachry Engineering Education Complex was from students. The Students Engineers Council donated \$1 million from the proceeds of its annual career fair as a means of giving back to the university and future engineering students.



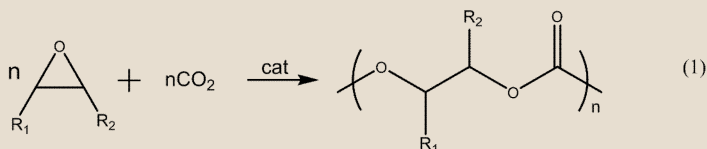
POLYMER TECHNOLOGY CENTER
TEXAS A&M ENGINEERING EXPERIMENT STATION
Phone: (979) 458-0918 Website: <http://ptc.tamu.edu>

The Construction of Functional Nanostructures Derived from CO₂-based Polymers.

*Distinguished Professor Donald J. Darensbourg
Department of Chemistry, Texas A&M University*



My research program has been using the abundant, nontoxic and inexpensive CO₂ as a renewable C1 feedstock for coupling reactions with epoxides to provide aliphatic polycarbonates (eq. 1).



This project has been extremely dependent on our ability to synthesize efficient and selective metal catalysts for this process. Copolymers of ethylene oxide or propylene oxide with CO₂ are currently receiving much commercial attention for the preparation of polyols for employment in polyurethane synthesis. Because of the hydrophobic nature and lack of functionalities of most of these polycarbonates, their use as functional materials is limited. In order to expand the use of these biodegradable and biocompatible materials, we have recently focused on synthesizing amphiphilic block copolymers.

Relative to this goal, we have developed a facile, one-pot synthesis of AB and ABA block polymers where B is a hydrophobic polycarbonate and A is a polycarbonate containing a vinyl functionality. Subsequently, in a post polymerization process, the A block can be functionalized using thiol-ene click chemistry with various thiols, including mercaptoacetic acid or 2-(Boc-amino)ethanethiols.

Amphiphilic block polycarbonates can be achieved following the addition of bases or acids. The resultant polymers have been shown to undergo self-assembly in water to form nanoparticles with high uniformity. These polymers are being investigated for their use in biomedical applications. Other, similarly prepared block polymeric materials containing amide groups have been shown to possess autonomic self-healing properties based on hydrogen-bonding interactions (Figure 1).

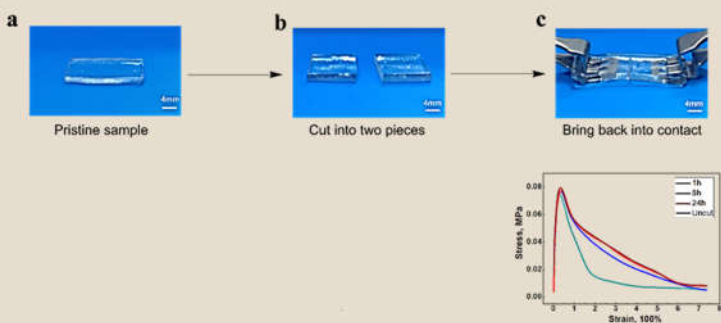


Figure 1. Sequence of sample tests with corresponding self-healing without any external stimulus. Standard stress-strain tensile test following various self-healing time periods.

Processing for Property Control

*Associate Professor Terry S. Creasy
Department of Materials Science & Engineering*



The Creasy group studies processing for thermoplastic and thermoset polymer materials in both neat and fiber reinforced materials. Equipment and instrumentation in the group is broad and includes microextrusion, industrial extrusion, filament winding, compression molding, and convection oven or autoclave processing. Dr. Creasy's students learn all aspects of polymer processing including component and tooling design, real time data acquisition, and computer-numerical-control for both processes and machining.

Current projects include processing of ultra-thick semi-crystalline thermoplastics in an instrumented compression tool containing a 3D array of over 20 thermocouples and winding advanced composite flywheels for energy storage. Instrumented tooling with controlled thermal history allows the researchers to simulate industrial practice to determine the effect industrial operations have on the properties and to explore new process methods that might enhance material performance or make the property distribution more uniform. For advanced flywheels, Dr. Creasy has teamed with Dr. Naraghi—a PTC member in Aerospace Engineering—to combine carbon nanofiber with conventional fiber to improve energy storage density.

In addition, the Creasy group is exploring new methods in 3D printing of thermoplastic and thermoset matrix composites to enable new applications for these high specific strength materials.



This model flywheel will combine carbon nanofiber with conventional carbon fiber to increase the energy storage density for home and industrial applications.



By instrumenting and control industrial tooling, standard production methods can be better understood and controlled.

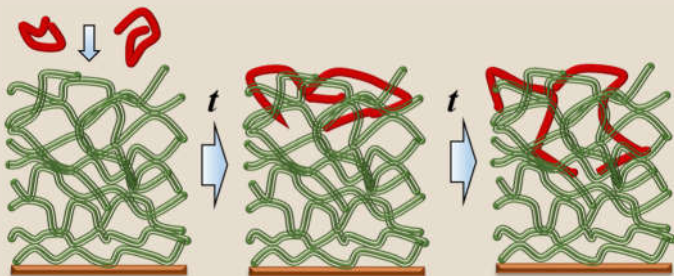
Polymer movement: key to next-generation coatings

Researchers in the Department of Materials Science and Engineering at Texas A&M University, led by doctoral student Victor Selin and Dr. Svetlana Sukhishvili, are making headway in understanding fundamental principles that will help to create the next generation of biomedical coatings.



The group is working to gain a fundamental understanding of the growth and behavior of multilayer polymer films to create functional films on the surface of different materials and aims to be able to control their properties and structures. These properties are important because they dictate how such films interact with aqueous and salinated solutions. Their work has revealed that by simple manipulations during film buildup, these properties can be easily controlled.

Full story: goo.gl/ghR3J2



Lutkenhaus selected as Kavli Frontiers of Science Fellow and named ACS Rising Star

Lutkenhaus presented a lecture titled, "Plastic Power: Organic Polymer Batteries," in which she discussed the functions and opportunities of energy storage platforms, primarily consisting of polymers. Along with presenting this lecture, Lutkenhaus was also named a Kavli Frontiers of Science Fellow.



Later in the month, Lutkenhaus received a tremendous honor from the American Chemical Society (ACS). She was named a Women Chemists Committee (WCC) Rising Star. According to the ACS, the WCC Rising Star Award recognizes women scientists "approaching mid-level careers who have demonstrated outstanding promise for contributions to their respective fields." Along with the award, all of the winners are invited to present at a symposium in their honor.

Full story: goo.gl/wvdEPc

PTC would like to welcome and recognize our newest member to the Polymer Technology Industrial Consortium-PTIC.

Sasol Chemicals Company— Sasol Limited is an integrated energy and chemical company based in Sandton, South Africa. The company was formed in 1950 in Sasolburg, South Africa, and is the world's first oil-from-coal company.

North America locations: Arizona, Louisiana, Pennsylvania and Texas

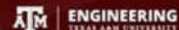
PTC WELCOMES SASOL



#1

Texas A&M Engineering
online graduate program
RANKED #1 IN TEXAS

by U.S. News & World Report



Texas A&M University's online graduate engineering program was ranked first in the state of Texas according to the 2018 rankings released Jan. 9 by *U.S. News & World Report Best Online Graduate Engineering Programs*. The program was ranked No. 8 in the U.S. overall and No. 6 among public institutions.

"The high ranking of our online engineering graduate degree program by *U.S. News & World Report* reflects our dedication to providing high-quality programs across The Texas A&M University System," Chancellor John Sharp said. "This latest announcement underscores Dean (M. Katherine) Banks' incredible leadership, and confirms that the ongoing investment in faculty and facilities being made by the College of Engineering is positively affecting not only our traditional on-campus rankings but online degree programs as well."

Full story: goo.gl/murwJz

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A Note from the SPE Student Chapter President



Howdy! Our SPE chapter is very excited to announce that we were awarded a 2018 Outstanding Student Chapter Award at ANTEC this past March. As the semester draws to a near we would like to reflect on the past events we had for the spring semester.

General Meetings:

February 9—Dr. J.M. “Mike” Killough from INEOS Olefins & Polymers USA
 March 2—Brief videos from professors here at Texas A&M (summary of research and advice)
 April 6—Dr. Joseph Lowery from Dupont
 April 27—Dr. Flores & Dr. Summerhill Zigmond from BASF

Outreach:

February 22—Discovery Night at Rock Prairie Elementary
 April 24—Science Night at Pebble Creek Elementary

We as always are grateful to the SPE South Texas Chapter for its support through donations and scholarships. If you are interested in becoming involved with our chapter, please check out our group on Facebook:

[facebook.com/groups/tamuspe/](https://www.facebook.com/groups/tamuspe/)

Mohammed Haque
 SPE Student Chapter President
myhaque123@tamu.edu



Dr. Jodie Lutkenhaus (SPE Chapter Advisor) & Mohammed Haque (SPE Chapter President)

Polymer Specialty Certificate Updates

Students that have applied for the Polymer Specialty Certificate	69
Students that have received the Polymer Specialty Certificate	50

For more information, please visit: <http://ptc.tamu.edu/polymer-specialty-certificate/>

Have Questions?

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