



POLYMER TECHNOLOGY CENTER

Summer 2005 Edition



PTC Newsletter

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Mark your calendars for upcoming SPE & PTC seminars



Overview of the History and Technology of Styrenic Block Copolymers

Dr. David R. Hansen
KRATON Polymers
Monday, September 19, 2005
6:00pm
Chem. Bldg. Room 2121



POLYMER TECHNOLOGY CENTER

Boeing Composite Materials Developments

Dr. Thomas K. Tsotsis
The Boeing Company
October 3, 2005
11:00-12:00
Engineering/Physics Building
Room 204

MARK YOUR CALENDAR FOR PTC's NEXT CONFERENCE!

October 13 - SCRATCH
@ Detroit, MI

October 28 - PTIC
@ Texas A & M University

ADVERTISE IN THE PTC NEWSLETTER!

If you are interested in placing an ad in the PTC quarterly newsletter, please contact Isabel Cantu. Revenue will be used for PTC Student activities.

Scratch Behavior in Polymers Consortium

We are pleased to announce a new member to the Scratch Behavior in Polymers Consortium: Japan Polypropylene Corporation



Japan Polypropylene Corporation

Meet Dr. Melissa A. Grunlan, PTC's newest Faculty Member Department of Biomedical Engineering



Dr. Melissa A. Grunlan joined the Department of Biomedical Engineering (TAMU) in the Fall of 2005. She received her B.S. (Chemistry, 1995) and M.S. (Polymers & Coatings, 1997) from North Dakota State University in Fargo, ND. She then worked for the H.B. Fuller Company (St. Paul, MN) as a senior chemist for four years. Her Ph.D. (Chemistry, 2004) is from University of Southern California (Los Angeles, CA). She did her post-doc with Prof. David E. Bergbreiter (TAMU, Chemistry) for one year prior to joining the BME faculty. Her research area is focused on the preparation of novel silicone biomaterials. Of particular interest is the development of silicone-based materials which resist biofouling. In addition, hydrogels and latex particles which possess thermoresponsive behavior will be investigated for controlled delivery applications. Dr. Grunlan is a member of the American Chemical Society (ACS).

Related links:

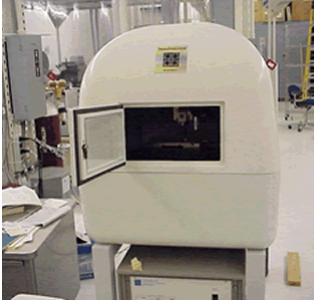
<http://thelook100.tamu.edu>
<http://www.tamu.edu/vision2020>

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Material Characterization Facility (MCF)



- Hysitron TriboIndenter
 - o Low-load nanomechanical testing system
 - o Normal and lateral force loading configurations
 - o Load resolution: <math><1\text{ nN}</math>
 - o Stage resolution: 50nm (in X and Y); 3nm (in Z)
 - o In situ scanning probe microscopy feature



- Mask Aligner: Quintel Q4000
 - o Top- and bottom-side contact lithography printer with the video-view split-field microscope used for submicron lithography
 - o Both 3" and 6" wafer capability



- Spin Coater: SCS P6204 (non-programmable)

Custom-Built Creep Station By Jong-II Weon



Figure 1 Custom-built creep station for adhesive specimen and environmental chambers.

Long-Term Creep Behavior

The time-temperature superposition principle, which involves the reduced time concept, has been extensively utilized for estimating long-term performance of polymers. Based on the assumption of thermo-rheological simplicity, short-term experimental data within the linear viscoelastic regime and at a reference temperature can be shifted individually to construct a master curve (Figure 4). In other words, the nominal creep curves made with specified strain at elevated temperatures are superposed by horizontal shifts along a logarithmic time scale to construct a single master curve covering a larger time range.

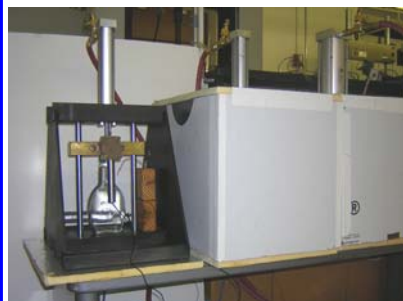


Figure 2 Custom-built creep station for bottle specimen and environmental chambers.

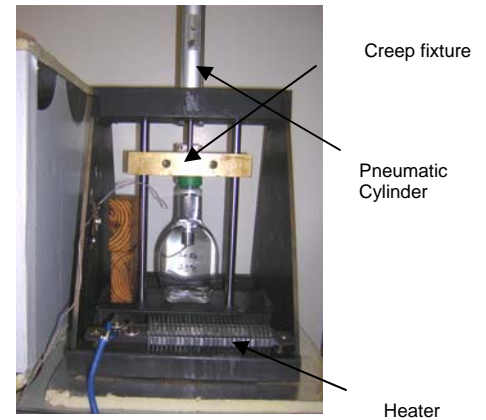
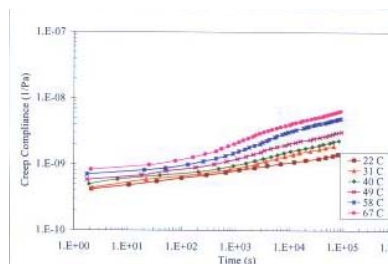
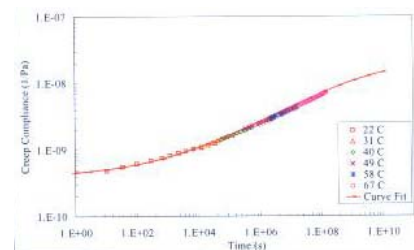


Figure 3 Custom-built creep station for bottle specimen.



(a)



(b)

Figure 4 The creep compliance vs. time curves; (a) individual creep curves and (b) the master curve at 22 °C.



**Escuela Superior Politecnica Del Litoral (ESPOL)
Guayaquil, Ecuador**



Andres F. Rigail, Professor of Mechanical Engineering, Escuela Superior Politecnica Del Litoral (ESPOL)

Agreement between PTC at Texas A&M University and La Facultad de Ingenieria en Mecanica Y Ciencias de la Produccion (FIMCP) Escuela Superior Politecnica Del Litoral (ESPOL) Guayaquil, Ecuador

PTC at Texas A&M University and The Escuela Superior Politecnica Del Litoral (ESPOL) have entered into an agreement of cooperation to establish a program of exchange and collaboration in areas of interest and benefit to both institutions

- Each Institution will participate in the exchange of faculty for joint teaching and collaborate in research
- To achieve these goals, PTC and FIMCP will:
 - ◊ Promote institutional exchanges by inviting faculty and staff to participate in a variety of teaching and/or research activities and professional development.
 - ◊ Organize symposia, conferences, short courses and meetings on research issues
 - ◊ Carry out joint research and continuing education programs
 - ◊ Exchange information pertaining to developments in teaching and research at each institution
- A budget for each specific program activity will be developed and approved prior to implementation.
- Professors, coordinating this program are:
 - ◊ MSc. Andres Rigail, Professor of FIMCP at ESPOL
 - ◊ Dr. Hung-Jue Sue, Professor of Mechanical Engineering Dept. and Director of PTC at TAMU
- Each Dept. agrees to comply with the host country's immigration guidelines in support of exchanges of international students and/or faculty.
- Upon approval by each institution, the Agreement shall remain in effect for a period of five (5) years unless terminated earlier by either institution.

Both institutions are looking forward on taking this opportunity to further the polymer studies on research to its limits.

Symposium on Relaxation and Fracture in Polymers Solids 230th National American Chemical Society Conference August 28th-September 1, 2005

The Symposium marked Professor Albert Yee's 60th birthday and honored the contributions he has made in the field of polymer science and engineering. The Symposium also addressed the fundamental mechanisms that govern the physical and mechanical responses of polymeric solids, with a particular emphasis on modifying or designing the material on the molecular, micro- and macro-structural scales to enhance physical properties. PTC would like to take this opportunity to thank the Companies listed below for their contributions to sponsor this event. PTC would also like to express our appreciation to the Speakers that made this an unforgettable event. Speakers were: Hugh Brown, Clive Bucknall, C.M. Chan, R.J. Gaymans, Dave Gidley, Zhibin Guan, Ziao Hu, Jimmy Kishi, Ed Kramer, Qinghuang Lin, Yiu-Wing Mai, Greg McKenna, H.E.H. Meijer, Kia Ngai, Don Paul, Ray Pearson, Christopher Plummer, Jake Schaefer, Christopher Soles, Sandy Sternstein, Hung-Jue Sue, John Torkleson, J. Wu, Wen-li Wu, Do Yoon, Bob Young. Our appreciation to the time spent from the organizers of this event: Qinghuang Lin (IBM), Raymond A. Pearson (Lehigh University), Christopher L. Soles (NIST), and Hung-Jue Sue, (Texas A&M University). Thanks for making this event a big success.



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PTC's Ph.D GRADUATE STUDENT



Dr. Goy Teck Lim

Given the opportunity to pursue a doctoral degree in USA had been a dream come true for me. Arriving in College Station in the summer of 2000, I joined the Department of Mechanical Engineering of Texas A&M University (TAMU) as a graduate student working under Dr. J.N. Reddy. Through collaboration between Drs. Reddy and Sue, I was put to work in the research team for the Scratch Behavior of Polymers Consortium and began my five-year "love-hate" relationship with polymer research.

Coming from a structural engineering background, combining materials science study of polymers with mechanical analysis has been a challenge for me, even till today. Through these years, I have learnt much about polymer behavior through the patient guidance of my two professors and helpful discussion with fellow colleagues and consortium members. As it had turned out, working in the scratch research had provided me the opportunity to attend conferences and interact with industrial partners. It has also allowed me to develop a better appreciation of the industrial contribution and its influence on engineering.

For my years in TAMU, I would like to sincerely thank both Drs. Reddy and Sue for the academics opportunities they have provided and their thoughtful advices to nurture me to be a good researcher and a better individual. Now moving onto the next phase of my life, there bounds to be more hills and valleys along the way. But for this new journey, I have the extra life experience and unique memories from Aggieland for guidance.

Finally with humility, I want to share the happiness of my graduation with my family, my two professors, PTC staff (Ms. Nix, Strickland and Cantu), fellow colleagues and all Scratch Consortium members. Thank you all for being there along this journey!

ANTEC 2006 Is Coming!

The Annual Technical Conference (ANTEC) of the Society of Plastics Engineers is the largest international gathering of individuals representing industry, government and academia in the fields of plastics and synthetic polymers. Engineers, scientists and business professionals attend ANTEC



to share ideas, to learn about the latest advances in technology and applications, and to meet and network with peers. ANTEC 2006 will take place from **May 7 through May 11** in **Charlotte, North Carolina**. There will be a large number of excellent technical sessions at the meeting. Please consider submitting a paper for one of the focused sessions at ANTEC 2006. SPE Student Chapter at Texas A&M University would like to provide any possible assistance to support students attending this event. Details about the travel will be announced in future notices. For more information about ANTEC 2006, please visit www.4spe.org.

Key dates:

- October 14, 2005 is the deadline for abstract submission.
- December 2, 2005 is the deadline for paper submission.

International Polyolefins Conference 2006 Is Coming! "From Reserves to Retailers - The Changes Overtaking the Polyolefins Business Worldwide"



The South Texas Section of the Society of Plastics Engineers (SPE) in partnership with the Polymer Materials and Additives Division (PMAD) of SPE and The Thermoplastic Materials and Foams (TPM&F) Division of SPE is sponsoring the upcoming "International Polyolefins Conference 2006" to be held **February 26 through March 1, 2006** at the **Wyndham Greenspoint Hotel, Houston, Texas**. SPE Student Chapter at Texas A&M University would like to encourage students to participate this event by ushering or joining poster contest. For more information, please visit <http://www.spe-stx.org>.