

News



The Society of Plastics Engineers

ENGINEERING PROPERTIES & STRUCTURE DIVISION

April 2006

Plastics e-Learning

www.plastics-elearning.com

— By Ian Harrison, Penn State University

This brief article is to introduce a website that I am in the process of developing and populating, that serves as a free source of learning tools for basic concepts in the plastics area. [Simply click on the website address above, www.plastics-elearning.com, to visit the website.]

Much of the material is already in place but more material and teaching aids will be added in future. Key concepts have been distilled from the science, engineering and technology of plastics, and are presented as e-learning tools.

Each learning concept is a single item from a collection that represents this author's idea of what constitutes the study of 'plastics'.

An objective of this suite of learning modules is to provide a framework from which to hang other ideas that

viewers may develop from future studies or experiences in plastics.

- Learning concepts are explained at a basic level using animation.
- Extensive text and complex equations are kept to a minimum.
- Comprehension starts at approximately junior/senior high school science level.
- Suitable for students/personnel in plastics and related academic or industrial areas.

In order to present individual concepts in a readily accessible manner, and to show general relationships between concepts and to aid in navigation, the discipline of 'plastics' has been organized into several parts:

- Defining Characteristics — how plastics differ significantly from other materials.
- Synthesis — basics of polymer synthesis and structure of individual

polymer chains.

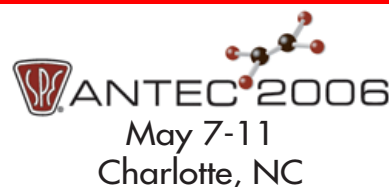
- Morphology — organization of polymer chains into aggregate structures.
- Bulk Properties — selected physical properties and their relationship to structure.

- Processing — basic processes used in the plastics industry to form solids.

This organization is presented as 'pop-up' menus and sub-menus. Menu items are also 'click-linked' to e-learning modules (currently not all menu items are linked).

The images in this article are screen captured from the site and shown as inverted gray scale. In Figure 1, 'rolling-over' on 'Defining Charac-

Continued on page 4



EPSDIV TOPCON 2006
Call for papers
see page 6

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Figure 1

Defining Characteristics	Mole Weight			
	Orientation	Herman's OF	WAXS	Unit Cell & Waves
Synthesis	Viscosity		Birefringence	Crystal Size & Peak Width
			Other Methods	Orientation & Pole Figures
Morphology				Fraction Crystallinity
				WAXS VI
Key Bulk Properties				
Processing				

Working towards this year's goals



Hoang Pham,
Chairperson 2005-2006

Dear EPSDIV Members:

I like to take this moment to review the initiatives that EPSDIV has set forth to accomplish during the 2005 – 2006 year.

Our forefront goal is to provide education and training to our members and the plastics industry. The second goal is to expand our growth through increase in membership and recognition of our members.

To achieve our first objective, we are focusing on technology enhancement activities. The EPSDIV has organized a strong technical program for the SPE Annual Technical Conference (ANTEC).

At ANTEC 2006 in May, we will host nine technical sessions with six keynote speakers. We will introduce a new session on polymer surfaces and interfaces which focuses on topography and interfacial structures affecting final properties such as scratch and mar, adhesion and coatings.

In addition, EPSDIV is collaborating with the Akron SPE local section to sponsor an exciting new topical conference to be held in Akron, Ohio during the fall of 2006.

This TOPCON is organized around the topic of new developments and advances in display technologies.

We are continuing a good trend in our

second objective. As of January 2006, the growth of our division is currently at 1% relative to 2005. I encourage EPSDIV members to use the SPE website membership referral system. This method has been effective in recruiting new members for both the SPE and EPSDIV.

I am pleased to report that this year two of our members achieved the SPE Fellowship Award. This is a significant number compared to other divisions. EPSDIV stands behind our members when it comes to recognizing members' contributions to the polymer industry and technical academia.

On behalf of the Board, I would like to invite our members to wholeheartedly support our initiatives by participating at ANTEC, EPSDIV TOPCON 2006 and membership referral using the SPE website.

—Hoang Pham



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NPE 2006 — The International Plastics Showcase
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- June 19-20: Crystallization & Mechanical Behavior of Polymers / Pravin Soni
June 19-20: Plastic Materials, Processing & Applications / Jean-Michel Charrier
June 20: Flame Retarding Plastics / Joseph Green
June 21: Principles of Polymer Blending & Alloying / Donald Witenhafer
June 22: Thermoplastic Elastomers / Vivian Malpass
June 22-23: PVC Melt Rheology - Theory & Practical Applications / Pravin Shah

Additional information available at:

www.4spe.org



Society of Plastics Engineers



Adoption of new By-laws is now complete



Don Witenhafer

The highlights of the last Council meeting involved the adoption of the new By-laws and the election of officers.

**EPSDIV and ANTEC
– UPDATE –
see page 5,
in this issue**

We're making membership easy

The SPE website membership referral system has been effective in recruiting new members for both the SPE and EPSDIV. Encourage interested people to visit www.4spe.org/join/

A special meeting of the membership resulted in a quorum (essentially all councilors) and the approval of a recommendation to hold a vote of all SPE members to cancel the SPE Constitution. The main reason for abandoning the Constitution is that it is very difficult to amend the Constitution requiring a two-third vote of the membership, but twenty percent of the members must vote to have a quorum. Getting this level of participation was fairly easy when we were a small society mainly located in the US mid-west, but today it is a challenge.

The council also approved the adoption of a new set of By-laws in the event that the cancellation vote is affirmative. The new By-laws are an attempt to incorporate all of the features of the old Constitution and By-laws into the new By-laws.

The most significant change in the new By-laws are that they can be amended by a majority vote of Council after holding two readings of the amendment at Council meetings and publishing the proposed amendment to the membership such as in *Plastics Engineering*, prior to the vote. This should give the membership sufficient time to comment on the changes prior to the vote.

The By-laws Committee and

some Councilors have identified some changes that need to be made in the new By-laws in order to be sure that important provisions of the old Constitution and By-laws will be adopted in the new By-laws. I voted for the new By-laws based on my understanding that these changes would be made as soon as possible if the new By-laws are adopted. I hope all of you have voted for the change. The voting will unfortunately be over before this issue of the newsletter is published.

Election results

The result of the voting for officers was somewhat surprising with Council ignoring some of the recommendations of the Nominating Committee. **Dr. Vicki Flaris** was elected President-Elect. **Bill O'Connell** was elected Senior Vice President. **Barbara Arnold-Ferret** was elected to Vice-President representing sections. My congratulations to all of them for their election victories.

I have a special request for you, see page 8 in this newsletter. The Divisions Committee is trying to put together a speaker's list of people who might consider speaking at Section meetings. Please consider responding favorably. Helping our sections has been a high priority of mine and I ask for your help.

— Don Witenhafer

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Plastics e-learning



Ian Harrison has created an online educational plastics resource.

teristics' pops-up Mole(cular) Weight, Orientation and Viscosity. Similarly, 'rolling-over' on Orientation 'pops-up' Herman's OF (Orientation Function), etc.

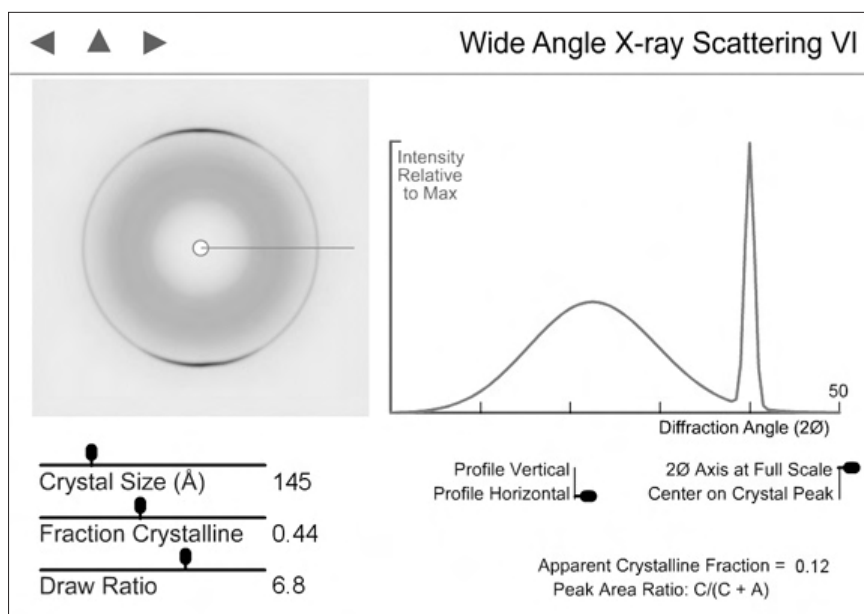
Two e-learning tools are used; scientific animations describe plastics concepts and may include virtual instruments (VIs) that promote 'learning by doing' using instrumentation techniques; and stand alone VIs. Both e-learning tools are characterized as Reusable Learning Objects (RLOs). Details of the various pedagogical theories associated with the advantages of using animations and virtual instruments are covered in a 'white paper'

on the site.

In Figure 1, the 'pop-up' menu above 'WAXS VI' is highlighted and if clicked produces a new page with a brief paragraph describing the VI. A link from this description leads to the actual VI. One of the first screens of this VI is shown in Figure 2.

Flash® is the tool used to construct animated sequences where, in this case, idealized 'photographs' and graphic plots are changed in real time in response to the viewer changing the 'slider' position. Typical VIs allow users to adjust various material

Figure 2



or instrument parameters and in this case outputs are shown as both a flat plate photograph and Intensity versus 2θ plot. Other sliders allow users to adjust their view of the plots. This particular VI has additional screens that encourage viewers to use relationships developed here to analyze various 'experiments'.

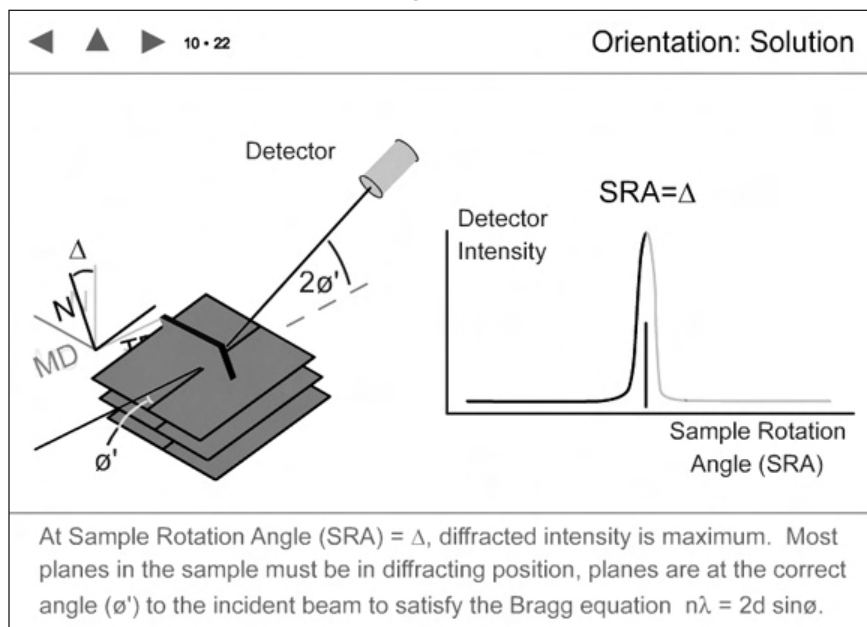
One 'stop screen' from a typical 'scientific animation' in this case from the 'Introduction to Problems and Solutions in Orientation' concept module is shown in Figure 3.

A typical concept module may contain from 20 to 30 'stops' with associated animation between stops and relatively few lines of text. In this case planes were rotated about MD and the corresponding intensity recorded graphically.

I have used the modules in various ways but usually in the form of 'blended' presentations, that is, I lecture using the modules as a super set of PowerPoint® slides but with an order of magnitude reduction in memory required.

Students have the modules available either on a website or as a CD for review or repeated playback to help comprehension. I usually also supply students with a hard copy of the text

Figure 3



Continued on next page

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Continued from previous page

in the modules together with some selected screen shots.

The VIs acts as a database of information that students can mine; homework questions help them pull out the appropriate information. Being a masochist at heart, it is always of interest to see what students can glean for themselves before you start asking directed questions.

There are currently 45 RLO modules distributed between the various parts of the plastics discipline although there are no modules in the Processing portion.

I have some modules to add to this portion but I'm looking for collaborators who might want to help in this area. Don't worry I'd do all the animation! Even if you have no interest in a collaborative effort I hope that you will take the time to view the site and play with the modules and give me some 'constructive criticism'. At a later date I'll offer the option of

downloading the RLO for personal use off the web and also include PDF hardcopy of the text material.■

Ian R. Harrison, Professor Emeritus, Materials Science and Engineering, Penn State University, can be reached at irh1@psu.edu or at 814.667.3107

NSF Support and Disclaimer:

This website is based in part upon work supported by the National Science Foundation under Grant No.s 9950072, 9952597 and 0302527. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author and do not necessarily reflect the views of the National Science Foundation.

Overall website design is by DzinForge www.dzinforge.com. However, the author is solely responsible for design and implementation of all e-learning RLOs and associated materials posted on the site.

ANTEC 2006

TPC program updates

—By Brian Grady, TPC Chair

ANTEC 2006 rapidly approaches, with approximately 60 contributions. Because of errors at National Headquarters, our program as printed in *Plastics Engineering* is incorrect; we are missing a significant fraction of our keynote speakers.

Just to recap, we have:

- **Ramanan Krishnamoorti** from the University of Houston talking about silicate nanocomposites on Monday morning (May 8th),
- **John Torkelson** from Northwestern University talking about confinement effects on Tg Monday afternoon,
- **Hongbing Lu** from Oklahoma State University talking about nanoindentation of polymers on Tuesday afternoon,
- **Chul Park** talking about foamable TPO/TPV also on Tuesday afternoon,
- **Al Pocius** from 3M talking about adhesion on Wednesday morning
- **Steve Michelson** from N.C. State talking about vibrational spectroscopy of polymers Wednesday afternoon.

Free Lunch

The Technical Program Committee board meeting will be held during lunchtime (12 noon) **Tuesday May 9** with lunch provided for everyone that volunteers to organize and chair a session (or the first 25 that show up, whichever comes last). For younger members, organizing and chairing a session is an easy way to meet people. The meeting will be held at the convention center in Room 218A.

Topcon 2006

— By Jeffrey Gillmor (Topcon Chair)

Dear EPSDIV members,

As we approach ANTEC 2006 I wanted to give you an update on the progress of our Topcon scheduled for October of 2006 in Akron.

Display technology is a large and growing business across the world for all types of different electronic products (cell phones, PDA's, and monitors). This technology demands many novel materials and material processing to fabricate the displays.

In light of this I think this conference will be very attractive to many of our EPSDIV members.

Lynn Loo from the University of Texas at Austin who is our TPC for the Topcon has put together a great technical program with six confirmed invited speakers as outlined in the Call for Papers. [lloo@che.utexas.edu]

We are now aggressively soliciting papers in order that Lynn can then complete the advance program.

The local arrangements committee, which is chaired by Josh Wong from the University of Akron has arranged for meeting facilities at the university along with space for corporate sponsor exhibits. The local SPE Akron Section, which is a co-sponsor of the Topcon, has prepared a list of local hotels for our attendees along with advertising the Topcon at the local ACS meeting in Akron.

Maria Russo and Leslie Kyle from SPE headquarters have been invaluable in providing information on how to organize a successful Topcon during our teleconferences and many emails.

Once the advance program is ready SPE is ready to update our website with a link to the registration page. I would encourage all of our members to support this Topcon in any way they can by presenting a paper or soliciting papers and attendance at the meeting.



SPE EPSDIV TOPCON 2006: Recent Advances In Organic And Polymer Display Technologies

October 23-24, 2006
University of Akron, Ohio

Call for Papers



This topical conference will provide an update on the latest research in display technologies, with an emphasis on molecular and polymer light emitting materials and liquid crystal polymers. Major technical challenges will be addressed. Focus will be on materials design rules and processing and fabrication technologies. Confirmed invited speakers include:

Dr. Ching Tang (Eastman Kodak Company)
Dr. Mike Lu (Universal Display Corporation)
Prof. Mary Galvin (University of Delaware)
Prof. Tom Jackson (Pennsylvania State University)
Prof. Stephen Cheng (University of Akron)
Prof. Satyen Kumar (Kent State University)

Topics of Interest include but are not limited to liquid crystal and polymers materials design and synthesis; photolithographic and non-conventional patterning and processing technologies for device fabrication; device characterization; lifetimes and reliability.

Opportunities for sponsorship and exhibiting space available. Contact Frank Cangelosi
Tel: 203-966-8880; Email: fcangelosi@unimin.com

Abstract Submission Deadline: May 1, 2006

Please submit abstracts to:

Prof. Lynn Loo, Technical Program Chair

Department of Chemical Engineering, University of Texas, Austin, CPE 4.422, C0400, Austin, TX 78712

Tel: 512-471-6300, Fax: 512-471-7060, Email: lloo@che.utexas.edu

Registration: <http://www.4spe.org/>

Local Organizing Committee: Shing-Chung Josh Wong (Chair), Nathan Jena, Cameron Frank, Kuan Gunes, Lloyd A. Goettler, University of Akron, SPE Akron Section

10 27 2004

Financial Report: January 1, 2006 - April 1, 2006

— Submitted by Emmett Crawford, EPSDIV Treasurer 2005-2006

BALANCE as of January 1, 2006	\$32874.49
(cash, checking, savings investments)	
INCOME	ACTUAL
Interest	177.98
Award Sponsorships	1000.00
SPE Rebate	1419.56
TOTAL INCOME	\$ 2597.54
EXPENSES	
Board Meetings	220.30
Newsletter Production	535.00
ANTEC Session Sponsorship	2930.00
Councilor Travel	697.34
TOTAL EXPENSES	\$ 4382.64
CASH FLOW	\$ -1785.10
Ending Balance as of April 1, 2006	\$31089.39

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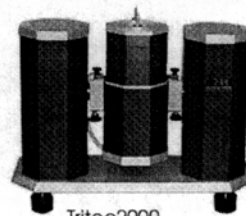
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Texas Tech University forms Society of Plastics Engineers Student Chapter

Texas Tech University has recently (September 2005) formed a student chapter of the SPE under the sponsorship of the South Texas Section. The chapter benefits from the strong support that SPE and its member sections and divisions provide for plastics education.

The faculty advisor to the Student Section is **Prof. Greg McKenna** who is a member of EPSDIV. The student president is Lameck Banda a Ph.D. student in Prof. McKenna's group. Membership to the Student Chapter is open to Texas Tech students who are members of the SPE.

Soon after being chartered, the South Texas Section made a donation of \$2000 for Chapter operations through the liaison to the Chapter,

Paul Banks (Texas Tech alumnus who is now with Fluoro-Seal, Inc). This money has been used for meetings and recruitment. The Chapter now has 22 members from both the graduate and undergraduate ranks.

The Chapter sent six members to the recently ended Polyolefins Conference in Houston, Texas (February 26, 2006 - March 1, 2006). Attendance to the Conference was facilitated by partial support from the South Texas Section of the SPE. During the Conference, the South Texas Section awarded the TTU Chapter \$3000 in scholarship money which will be disbursed during the Fall semester as six \$500 scholarships split between graduate and undergraduate students. In addition to the home

department of Chemical Engineering, the scholarships were advertised in the Mechanical Engineering and Chemistry departments and to provide visibility for the SPE in these departments.

The TTU student Chapter will send five members to the SPE Annual Technical Conference in Charlotte, North Carolina (May 8, 2006 – May 11, 2006). The South Texas Section will provide partial travel support for these students who will all be making presentations.

SPE Divisions Committee

AN OPPORTUNITY TO HELP — be part of a speakers' list

By Don Witenhafer, Councilor

The Divisions Committee of SPE is trying to collect a list of speakers who would consider speaking at an SPE Section Meeting.

We need from you a title, a very brief abstract of your talk, your name, address, phone number, and email address. Send this information to me at witenhaferd@cs.com and I will compile the information for submission to SPE for our Division.

Trust me, this effort can make a big difference for SPE sections.

Being on the list does not obligate you to give a talk. For example, if travel is involved you can work out arrangements with the section or just not go.

Below is an example of a talk that I am submitting. If you stick

with this format we will have uniformity. Thanks for your help. My talk is quite technical in nature but I will emphasize the practical.

EXAMPLE:

What People who work with or purchase PVC resin should know about resin particle structure.

Donald Witenhafer, Columbus Ohio 614-761-8308
witenhaferd@cs.com.

The difference between PVC resin supplier's products other than their molecular weight lies in the resin particle structure. This presentation will describe the particle structure of PVC resin and relate it back to the polymerization process. Tips on quality related issues will be discussed.

EPSDIV Officer Elections

It is time to re-elect the officers for the Engineering Properties and Structure Division of the Society of Plastics Engineers.

This year, we will be electing four new candidates.

Make your choices by casting your votes online at www.4spe.org/forms/d26ballot.php.

Or you may print the ballot and send to:

Michael Read,
The Dow Chemical Company,
1776 Building A-34,
Midland, MI 48674

Make your voices count. Cast your ballot by April 23, 2006.

For more information visit the Engineering Properties & Structure website at: www.4spe.org/communities/divisions/d26.php

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upcoming events

SPE Asia Conference 2006: June 7-9, 2006
Jeju Grand Hotel, Jeju Island, SOUTH KOREA
cm7.hong@samsung.com

Extrusion of Engineering Plastics – Simplified for Manufacturing and Process Engineers
July 17-19, 2006, Mystic, Connecticut
conferences@4spe.org

2006 Automotive Composites Conference & Exposition (ACCE): September 12-14, 2006
Troy, Michigan. conferences@4spe.org

FOAMS 2006: September 13-14, 2006
Elk Grove Village, Illinois. conferences@4spe.org

Color & Appearance Conference 2006
September 17-19, 2006, Cincinnati, Ohio
conferences@4spe.org

Don't hesitate.

There is still time to register for ANTEC 2006

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