



A Subdivision of the Rubber Division of the American Chemical Society

Fall 2011

www.ohiorubbergroup.org

PO Box 341, Bath, OH 44210

A Message from 2011 ORG Chair Doug Ruch, ChemRep, Inc.

**2011
Coming Events**

OHIO RUBBER GROUP

Golf Outing
Monday, August 29, 2011
Portage CC, Akron

Fall Technical Meeting
Tuesday, September 20, 2011
Twinsburg Hilton Inn

RUBBER DIVISION

180th Technical Meeting
Rubber Expo & Advanced
Materials in Health Care
October 11-13, 2011
I-X Center
Cleveland, OH

To all our members and friends, I hope everyone has had a great summer and is enjoying a strong business year.

We have had another successful year so far for the Ohio Rubber Group. With our first two technical meetings and one golf outing behind us we still have one more golf outing and technical meeting to look forward to.

Many thanks to Golf Co-Chair Tom Rickey for another fun and successful outing in June at Yankee Run Golf Course. Thanks also to all of you who supported the event by participating and making donations for the ORG scholarship fund.

The second and final golf outing is coming up fast so get your reservations in for August 29th at Portage Country Club, it is always a first class event thanks to all of Greg Sibley's efforts.

Looking ahead, the ORG will hold its next technical meeting and dinner at the Hilton Garden Inn in Twinsburg, Ohio on September 20th. The Rubber Division will hold a course on "Laboratory Safety" in conjunction with this ORG meeting. See page 2 for registration details.

It has been my honor and pleasure to serve as your 2011 Chair and I would like to thank all the board members and committee chairs for their outstanding dedication to our group. Best wishes to all of you and I look forward to seeing you at our upcoming events.



Rubber Division FREE Job Fair

DATE: October 13, 2011

TIME: 10 am – 2 pm

LOCATION: Cleveland, Ohio

Everyone is welcome to participate in the Rubber Division's Job Fair at the International Exposition (I-X) Center in Cleveland, Ohio. The Job Fair is being held in conjunction with our Rubber Expo and Advanced material in Health Care Show.

Companies are offered FREE participation in the Job Fair which includes a draped table along the perimeter of the room to display company information. Company representative will then be able to meet with all students and professionals who visit the event. There is no charge to attendees or companies who participate in the Job Fair!

Reserve your spot by calling Linda McClure, Technical & Student Programs Manager, 330-972-7978.

Space is limited, so please act quickly!

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Rubber Division Course

(In conjunction with The Ohio Rubber Group Spring Technical Meeting)

Tuesday, September 20, 2011, 2:00 p.m.-4:00 p.m.
Hilton Garden Inn, 8971 Wilcox Dr. Twinsburg, OH 44087

“Laboratory Safety”

Instructor: William Stahl

This course will review the following: Personal protection equipment; machine safety (mills, mixers, presses, calendars); chemical handling; MSDS reviews; chemical disposal; labeling; TOCSA, right to know; ergonomics; general site safety.

Contact crobinson@rubberdivision.org for reservations

Cost: \$99 per person (payable to the Rubber Division)

Please visit www.rubber.org/seminars for more information

All Photos by Shelby Washko. Thanks Shelby!



Schedule

2:00 –4:00 - Rubber Div. course

crobinson@rubberdivision.org for info

4:00 – ORG Registration

4:30 – Technical Presentations

6:00 – Social Hour

7:00 – Dinner (Reserve by 9/16/2011)

Fall Technical Meeting

Tuesday, September 20, 2010

(Rubber Division Course Information on Preceding Page)

**Hilton Garden Inn, 330-405-4488
8971 Wilcox Drive, Twinsburg, Ohio**



Technical Presentations

(Please see next page for abstracts)

"Liquid Diene Resin Technology"

Laura Shekleton, Applications Manager, Rubber & Plastics, Cray Valley USA LLC

"Nanocomposite Proton Exchange Membrane (PEM) based on High IEC Organic Nanoparticles"

*Emmanuel Pitia, Graduate Research Assistant, Polymer Engineering Academic Center, The University of Akron
Current Ohio Rubber Group Scholarship Recipient*

"Towards Robust Icephobic Coatings via Inexpensive Elastomer-Based Nanopatterning"

*Diya Bandyopadhyay, Graduate Research Assistant, Polymer Engineering Academic Center,
Department of Polymer Engineering, The University of Akron
Current Ohio Rubber Group Scholarship Recipient*



After Dinner Raffle - *Raffle tickets will be available for purchase at the meeting*

Technical Meeting - DINNER RESERVATIONS - Reserve by September 16, 2011

Advanced Reservation - \$35.00 each (will be held at door)

Without reservation - \$40.00 each

Please reserve _____ tickets

1. Pay at Door

OR

2. Payment Enclosed (check or credit card)

Credit Card # _____ Exp. Date _____

Name _____

Company _____

E-mail reservations to mpuskas@littlern.com OR mail to Ohio Rubber Group, PO Box 341, Bath, OH 44210

Nanocomposite Proton Exchange Membrane (PEM) based on High IEC Organic Nanoparticles

Emmanuel Pitia, The University of Akron, Polymer Engineering Department

The proton exchange membrane (PEM) is a critical component of a fuel cell. It serves as a barrier between electrodes to prevent crossover of reactants and facilitates transport of protons from the anode to the cathode. An effective PEM must be highly ion conductive, chemically stable, mechanically durable and cost effective. The current state-of-the-art PEM is a perfluorosulfonate ionomer, Nafion[®], produced by E. I. du Pont de Nemours Company. Although Nafion[®] has many desirable properties, it is expensive, limited to low-temperature operation ($< 80\text{ }^{\circ}\text{C}$), has water management problems and high methanol crossover when used in direct methanol fuel cells, DMFC. During the past decade, considerable research has been devoted to developing alternatives to Nafion[®], e.g., new ionomers, non-ionomeric polymers, and composite membranes. The objective of this research was to develop and study the properties of a two-phase, composite PEM containing high ion exchange capacity (IEC) organic nanoparticles dispersed in a relatively hydrophobic polymer. The hypothesis driving this research was that one might expect better dispersion, higher surface to volume ratio, and improved proton conductivity of a composite membrane if the conductive phase is nano-sized. Note that micron size particles have been previously studied and had proton conductivities similar to that of Nafion. To this end, high IEC ($\sim 4.5\text{ meq/g}$) nanoparticles of crosslinked poly (sulfonated styrene) were prepared by emulsion copolymerization of divinylbenzene and sulfonated styrene of quaternary alkyl ammonium cation. These nanoparticles were dispersed and will be aligned using electric field in a low sulfonated poly (ether ether ketone) to fabricate PEM. Due to swelling, the loading of high IEC nanoparticles was limited $< 20\text{ wt\%}$. However, they exhibited water uptake $\sim 25\text{ wt\%}$ at room temperature which is similar to that of Nafion. Characterizing membrane properties such as proton conductivities, methanol and water absorption, alignment, and mechanical properties are underway.

Towards Robust Icephobic Coatings via Inexpensive Elastomer-Based Nanopatterning

Diya Bandyopadhyay, Gurpreet Singh, Manish M. Kulkarni and Alamgir Karim

Ice formation and accretion on modern-day infrastructure and appliances hampers the smooth functioning of transportation, communication, energy sources, and as such our daily lives. Most strategies currently employed to mitigate ice accumulation are resource intensive as well as ecologically unfavorable. A few instances include chemical coatings, salt solutions, gels, and greases that not only require periodic and frequent re-application but also affect the environment adversely. In this work, we present a more reliable and economical method that involves engineering surfaces with inherent icephobicity. Inspired by nature, we exploit the fact that intricately textured surfaces, for eg. lotus leaves, can repel water with ease and thus act as superhydrophobic surfaces. To this end, we have successfully fabricated nanopatterned polymer films and coatings via capillary-force lithography using elastomeric masks. A custom built temperature gradient hot stage was used to study the nucleation and condensation process of ice formation and accretion on the patterned surfaces. Interestingly, we found that patterned coatings generated by this relatively easy technique demonstrated a very high tendency to retard ice-formation and accumulation, and in addition exhibited significant robustness and stability.





Thank you to the 2011 ORG Hospitality Sponsors

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Division News from Andrew Tisler, Area Director

Steering Committee Minutes: Minutes from the recent July meeting of the Steering Committee are attached.

Education & Publications: The August 16th education workshop being held at the Rubber Division Headquarters has sold out. This is the course on Elastomer Molding Technology. Due to space, the attendance is limited to 20 people; however, Education & Publications Manager Christie Robinson is already planning to hold another workshop in the future for those who could not attend this one. Additionally, the Division is holding a course on Selecting the Right Elastomer for your Sealing Application on September 8th at the Fort Wayne Rubber & Plastics Group meeting and a course on Laboratory Safety on September 20th at the Ohio Rubber Group meeting, both being taught by Bill Stahl. Christie also received notice from West Pharmaceuticals that they will be registering 30-40 employees for the Division's Basic Rubber Technology online course. Remember that there will be ten workshops held at the upcoming Rubber Expo & Advanced Materials in Health Care show in Cleveland. The Division has also added fifteen new technical publications this year. Go to the Division's website, www.rubber.org to see course details and all publications. If you or anyone in your company is interested in attending a workshop or taking an online course, contact Christie at crobinson@rubber.org.

RC&T Journal: Editor Will Mars and Christie Robinson are continuing to work on obtaining a new publishing agency for the Division's Rubber Chemistry & Technology Journal. The two being considered are Allen Press and the American Chemical Society. They are reviewing the proposal recently received from Allen Press and are awaiting a proposal from ACS. Although the Division has until December 31, 2012 to make the transition from the current publisher (AIP), the goal is to complete this by the end of this year so that the journal will be under the same system as of January 1, 2012.

Sponsorship Update: Marketing & Membership Manager Karen May has obtained commitments from the following sponsors to date and is waiting to hear from several others: **12 Month: Gold** - Lord Corporation, Dow Chemical and ExxonMobil Chemical; **Silver** - ChemRep and Stemaco USA; **Bronze** - Rubber Sheet Roll, R.E. Carroll, Inc, Lehigh Technologies and Rubber Flooring Inc; **Rubber Expo: Coffee** - ExxonMobil Chemical (Technical Session) and Lord Corporation (Show Floor); **Registration Bags** - Preferred Compounding; **USB Drives** - Chevron; **Corporate Tables** (Exhibitors Reception) - Harwick Standard Distribution Corp, Sartomer USA, LLC, Alternative Rubber & Plastics, Inc, R.E. Carroll, Inc and Lianda; **Lanyards For Badges** - Nynas; **Hotel Key Cards** - Holly Lubricants & Specialty Products; and **Rubber Expo Flooring** (pending negotiations) - Lehigh Technologies Inc. If your company is interested in becoming a sponsor at a specific level or for a specific event or function, please contact Karen at kmay@rubber.org.

Rubber Expo & Advanced Materials in Health Care: As of today, Expo & Meetings Manager Beth Berkheimer has contracted 219 booths (vs 217 booths in 2009), with more signing up each week. This includes 50,800 total square feet of space (vs 44,100 sf in 2009), which equates to \$988,050 (\$913,560 Received PLUS \$74,490 Due). Beth and Executive & Meetings Assistant Melanie Avdeyev continue to work with exhibitors to pay their final amount due as well as to bring in new exhibitors. Total number of pre-registrants is 298, which includes 51 for the technical symposia. Remember that the cutoff for pre-reg discounts is October 3rd. Also, if your company is interested in a booth, contact Beth at bethb@rubber.org.

S&T Awards: The Science & Technology Awards Committee will meet on August 25th to select recommended award winners. We have 28 nomination packages, which includes all six awards. Once the selection is completed, there will be an email vote by the Executive Committee. This is required in order to allow time for the Secretary to notify the award winners, obtain bios & photos and give to Rubber World for the Show Daily (published Tuesday at the fall expo).





Yankee Run Golf Outing

Tom Rickey, 2011 June Golf Outing Chair

The June 2011 Golf outing was a great success and good time for all. After a brief rain delay, the 124 golfers enjoyed a beautiful day. We also had good attendance at the banquet that followed. As always, the Yankee Run staff supplied an enjoyable dinner and a nice venue for the festivities afterward.

I would like to send a special "Thank You" to Americas International for supplying the golf balls that were given out at the scholarship holes. The monies raised during this activity go directly to the ORG scholarship fund to support future rubber professionals. This donation goes a long way to reduce the expenses of the outing.

In closing I would like to thank everyone that volunteered their time to make this outing a great experience for all. Without your time and commitment this event would not be possible. I would also like to thank the sponsors and all of you that participated. I hope to see all of you next year!

Many Thanks to the Golf Sponsors



