

EASTERN NEW YORK ASM/ HUDSON-MOHAWK TMS NEWSLETTER

December 2002

December Meeting

Tuesday December 10, 2002

Partners Night

Fine Dining and Wine Tasting at
the Award Winning

Yono's Restaurant

Located in the Armory Center at 64 Colvin
Avenue, Albany

Wine selection done by Craig Allen
of Allstar Wines

Hor'dourves will be served at 5:30 PM with
dinner and wine tasting to follow

**The ASM Chapter is accepting
applications for the**

2002 Eastern New York ASM Chapter Scholarship Awards.

**Undergraduate Student Award \$1000
Graduate Student Award \$1000**

**Application forms are available at
www.asm-easternny.org**

Applications deadline is **December 2, 2002**

ASM or Joint ASM/TMS Student
Membership is required for consideration.

To submit applications or for more
information contact ASM Chapter Awards
Chair: Steve Buress (buress@msn.com)

Historical Note

Glass Making

by Jack H. Westbrook

Man's use of glass (natural volcanic obsidian) dates from time immemorial, but manufacture of glass from sand and potash and/or soda from ~7000 BC. Despite the attractiveness and utility of the product for decorative purposes, containers and windows, glass manufacture has always been constrained by the scarcity of proper raw materials, refractory clays for crucibles, fuel for furnaces and skilled workers. Glass making was the first manufacturing enterprise introduced in America (VA, 1609), followed by Salem, MA in 1639. These enterprises were small scale; most glass still had to be imported. The first products of note were glass beads for trading with the Indians and containers of various types; window glass came along only much later. In New York State the first glass house (factory) was erected in 1787 by John de Neufville at Dovesborough, 8 mi. west of Albany. It was succeeded in 1796 by a new manufactory at Hamilton, 2 mi. further west, consisting of two glass houses, 3 furnaces, and 13 glass blowers that produced 20,000 sq.ft. of window-glass per month as well as bottles and decorative pieces of flint glass. In the late 1700s and early 1800s a glass works in New Lebanon produced glass thermometers and barometers. In 1806 the Rensselaer Glass Factory was established and in 1823 the Albany Globe Manufactory for kerosene lamps. By 1850 there were in the U.S. some 81 glass houses employing more than 3000 persons. Today containers and other blown glass are a \$10 billion/yr. business. However, there is no glass manufacture in the Capital District of industrial significance, although there are several crafters of stained and leaded glass and other decorative items.

To make glass, a relatively pure silica sand is needed which must be washed and sized. To obtain an achievable melting point, some alkaline oxide such as soda (Na_2O) from seaweed or potash (K_2CO_3) from wood ashes must be added, as well as possibly some lime and alumina as well. A typical composition (wt. %) might be SiO_2 (72%), Na_2O (15%), CaO (5%), MgO (4%), Al_2O_3 (2%) and B_2O_3 (1%). If the ingredients are sufficiently pure, the glass is colorless. If iron is present, a green color results; iron with sulfur gives an amber color; cobalt – blue; and manganese – purple.

Continued on page 3

December Meeting Tuesday December 10, 2002

Partner's Night Wine Tasting and Dinner at the Award Winning Yono's Restaurant

<http://www.yonosrestaurant.com>

Hor'dourves 5:30 pm

Dinner and Wine Tasting 6:30 pm

Herb Garden Ravioli (with Champagne Sauce)

Salad: Mesclun With Sesame-Ginger Dressing

Entrees Choice of

Chicken Pistachio

Chicken Breast with Prosciutto, Pistachios,
Mushrooms in a Madeira Cream Sauce

Or Sole Roulade

With Scallop-Crab Stuffing

Dessert: Triple Chocolate Fudge Torte

Wine selection and tasting by Craig Allen of All
Star Wines

<http://www.wineaccess.com/store/allstarwine>

Please register your dinner selection by
Thursday, December 5 by calling Jon
Schneider at (518) 395-6097 or email
schneie@kapl.gov

\$20/professionals and guests; \$15/retirees;
\$7/students



Note from ASM Chairman

Many of you will have noticed that there have been a number of organization changes at ASM International, with Stan Theobald recently being appointed as Managing Director. Don Muzika is our current President and he writes an excellent monthly column in Advanced Materials and Processes, and I would like to draw your attention to a couple of points he has made. Don regularly describes the activities that are going on in the society, and in the last issue he also summarized some of ASM's strengths, including : ASM possesses a membership that volunteers with passion; we have many local, national, and international meetings; we are in a strong financial position, we have well respected publications (including Advanced Materials & Processes, Metallurgical and Materials Transactions A & B, and the ASM Handbooks); we have initiated extensive web activities, we are made up of an extensive chapter network (including 120 chapters and 52 student chapters throughout North America and around the world); each summer ASM runs camps for High School students and High School teachers, and last, but not least, each year we recognize individuals with highly acclaimed International Awards. I think these are some of the features that make the membership of ASM International a great!

Bernard Bewlay
November 2002

ASM OFFICERS

Chairman: Bernard Bewlay (GE GRC) 387-6121
Vice Chairman: Evan Dolley (KAPL) 395-4541
Secretary: Luana Iorio (GE GRC) 387-6320
Treasurer: Lukas McMichael (RPI) 276-8938

ASM COMMITTEE

ASM Liaison Fellow: Martin Glicksman (RPI) 276-6721
Past ASM Chairman: Cathy Jordan (KAPL) 395-7276
Advisor: Jack Westbrook 885-8840
Quorum: Jon Schneider (KAPL) 395-6097
Public Relations: Dave Ferrill (KAPL) 395-4310
Membership: Jim Ruud (GE GRC) 387-7052
Awards: Steve Buresh (KAPL) 395-6759
Student Affairs: Linda Schadler (RPI) 276-2022
Student Liaison: Michael Magyar (RPI) 276-5879

TMS OFFICERS

Chairman: Louis Peluso (GE GRC) 387-7780
Vice Chairman: Jennifer Su (GE GRC) 387-5358
Secretary: Liang Jiang (GE GRC) 387-6346
Treasurer: Michelle Othon (GE GRC) 387-7785
Education: Laurent Cretegy (GE GRC) 387-5730

Two glass products of local interest are incandescent light bulbs and bottles. Both were originally hand blown. Edison's lamp bulb was invented in 1879 and by 1882 GE was obtaining 700 bulbs per day from Corning Glass, each individually wrapped in tissue paper and packed in barrels. However, within 10 years demand had grown to 2 million per year and a mechanization program was imperative that ultimately (1926) resulted in the famous ribbon machine, now capable of 2000 bulbs per minute! Similarly for bottles, split molds introduced in the 17th and 18th c. provided the possibility of irregular shapes and raised decoration, but bottles were still hand blown, and production was slow. The method of making the bottles in the 19th c. was as follows: A lump of glass would be taken from the furnace tank and expanded to a bubble by the breath of the glass worker through his blowpipe. After the bubble reached a certain size, it was reheated, placed inside a mold, and blown vigorously while being rotated. When the bottle was completed, the mold was opened, an assistant would push in the round bottom with an iron rod (pontil), the neck part would be cracked off the blow pipe, the bottle reheated and placed in another machine that would form and finish the neck. Only in 1889 was the bottle-making process fully automated. Current equipment can produce 20,000 bottles per day!

The popularity of Saratoga Springs mineral water led to its bottling and distribution all over the U.S. and even to Europe. In the mid-1800s bottles for this application were being produced by the Mt. Vernon Glassworks near Syracuse for the Congress Spring and the Empire Spring. In 1843 the Mt. Vernon Co. was owned by two brothers, Oscar and Charles Granger, former residents of Saratoga Co. Due to the strength of the mineral water bottling business and the scarcity of fuel near Syracuse for the glassworks furnaces, decision was made in 1844 to move the glassworks to Saratoga Co. A 1400 acre, heavily wooded, site near Lake Desolation was chosen, about 8 miles west of Saratoga Springs. It was necessary to build, not only the glassworks, but an entire town (Mt. Pleasant) for the workforce, complete with homes, post office, school, church, and hotel. Subsequently, due to the merger of the Congress and Empire Spring Cos., Oscar Granger was persuaded to sell the glassworks to the newly formed Co., who, in 1867, to save transportation costs, moved not only the glassworks but ultimately the entire town of Mt Pleasant to the West Side of Saratoga Springs, an area known as "Congressville". Production in 1873 amounted to 1.2 million bottles. Today the Mt Pleasant site is deserted, and the Congressville works is no more, noted only by a NYS Historic Marker.

To better appreciate both the history of glass technology and the aesthetics of the products, we are fortunate to have access to the National Bottle Museum on Milton Ave. in Ballston Spa and the Corning Glass Museum in Corning, NY.

"Who, when he first saw the sand and ashes by a casual intensesness of heat melted into a metalline form, rugged with excrescences and clouded with impurities, would have imagined that in this shapeless lump lay concealed so many conveniences of life as would, in time, constitute a great part of the happiness of the world"

Samuel Johnson 1750

Congratulations to the TMS Hudson-Mohawk 2002 Poster & Micrograph Contest Winners

Graduate Student Poster

1st place: \$200

Benjamin Ash, RPI, "Mechanical and Thermal Properties of Nanocomposites"

2nd place: \$50 each

Amitabh Bansal, RPI, "Mechanical Behavior of Polymer Nanocomposites"

Ami Eitana, RPI, "Nanotube Polymer Composites: Tailoring the Interface for Improved Mechanical Properties"

Professional Poster

1st place, \$200

Afina Lupulescu, RPI, "Kinematics of Melting in Microgravity"

2nd place: \$100

Julie D-Arcy-Gall, RPI, "Templateless Assembly of Nanowire Cages"

Graduate Student Micrograph

1st place: \$100

Dongling Ma, RPI, "Self-assembly of Nanoparticles into Caped Microtubes"

Professional Micrograph

1st Place: \$100

Y.C. Lau, GE Global Research, "Plasman"

TMS would like to thank all the participants and the judges who made the poster competition a success.

This newsletter and other chapter information can also be found on the

ASM Chapter website:

<http://www.asm-easternny.org/>

Please send any newsletter announcements and suggestions to Luana Iorio at lorio@crd.ge.com.

Calendar of Events

- December 10:** Partners Night at Yono's
- January 28:** TMS Distinguished Career Award at the Century House
- February 18:** Joint ASM-AWS Meeting at The Century House
Speaker: George Young, KAPL
- March:** Geisler Award and Awards Night
- April:** ASM/TMS Spring Symposium
- May:** Plant Tour, Details TBA

Nominations Sought for TMS Annual Distinguished Career Award

Nominations are being sought for the 2002 TMS Distinguished Career Award, the highest recognition awarded by the Hudson Mohawk Chapter of TMS. The award is given to a member or recent member of the local technical community in recognition of a distinguished career in Materials Science. The selection will be made by the Awards Committee of the chapter, which is headed by the past chapter chairman and includes the Executive Committee

More information and nomination forms can be obtained from <http://www.asm-easternny.org/> or by contacting Lou Peluso.

Please submit nomination forms along with a supporting letter to Lou Peluso by **December 13th** at louis.peluso@crd.ge.com or call for more details at 387-6972.

You are cordially invited to the Department of Materials Science and Engineering Rensselaer Polytechnic Institute sixth annual General Electric Distinguished Lecture in Materials Science and Engineering

“NANOMECHANICAL RESPONSE OF MATERIALS: STRUCTURAL, FUNCTIONAL AND BIOENGINEERING APPLICATIONS”

Subra Suresh

Department of Materials Science and Engineering
Massachusetts Institute of Technology

Monday, December 9, 2002

4:00 PM, RPI Campus LOW CII Building, Room 4050

(See directions below)

Reception immediately following the seminar in the Low Lounge.

Advances in instrumentation and computer hardware and software have provided unprecedented opportunities to assess the mechanical response of materials and surfaces down to length scales on the order of a nanometer. This presentation will provide an overview of our recent work and some new advances in the determination of mechanical response in sub-micro-scale and nano-scale systems which are broadly categorized into three distinct groups: (1) systems with mechanical as well as nonmechanical functions, where the physical dimensions are typically smaller than 100 nm, (2) bulk materials whose characteristic microstructural dimensions are typically smaller than 100 nm, and (3) systems at the level of single biological molecule or macromolecular unit. Particular attention will also be devoted to the issue of the nanomechanics of contact at surfaces. Examples of nanomechanical response drawn from microelectronics, magnetic storage media, micro- and nano-electro-mechanical-systems and molecular bioengineering will be discussed along with challenges and opportunities for experimental and computational studies, and possibilities for the detection of functional properties during mechanical deformation. The approaches outlined here provide possibilities for extracting mechanical and functional responses of materials in a manner not feasible by other available techniques. The presentation will conclude with a summary of the effects of size scale on the properties of materials used in a broad range of applications.

For information call (518) 276-6372 or (518) 276-6451.