



# ISOTOPICS

The Cleveland Section of the American Chemical Society

Volume 84

Issue 1

January 2008

## On Deck:

**Wednesday, February 20**

**Dr. Alan Rocke**

*How a Quaker Schoolteacher  
Invented Atoms: John Dalton  
and His Theory*

Venue: GrafTech

## January Meeting Notice

Wednesday, January 16, 2008

Mather Mansion

Cleveland State University

4:30 pm	Executive Committee Meeting
5:30 pm	Social Time
6:00 pm	Dinner
7:00 pm	Lecture
8:00 pm	Informal Discussion

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## Molecular Spectroscopy in Microbial Forensics

*Dr. Kathryn Kalasinsky, Armed Forces Institute of Pathology*

Since the fall of 2001, anthrax has been the center of attention for bioterror detection. Knowing the presence or absence of biological threats is key to safety of the military and security of the homeland. The initial effort in any bioterror analysis is to identify the actual threat, but, in addition, the background material or non-biological material can help identify the source or origin of the threat. Numerous detection techniques have been explored, but the goal is for a rapid, sensitive, and specific method that can be readily transported to various sites. Infrared and Raman spectroscopy have the desired specificity, and combining them with other sampling techniques such as attenuated total reflectance and imaging has greatly increased the sensitivity. Appropriate identification also relies on accurate reference data sets as well as the ability to separate the organism from a vast array of environmental background material. Efforts to assure that the reference materials are an accurate representation of the desired biological organism is as important as obtaining good quality data. Without a qualified signature library the analytical results lack reliability. Many diagnostic and proteomic steps are applied to each biological sample to maintain the integrity of the necessary biological reference data. Infrared and Raman spectroscopy are being used and have shown that molecular analysis of bioterror materials can readily be achieved in threat identification.

**DINNER RESERVATIONS REQUIRED:** Please RSVP by contacting Rachael Barbour, by phone at 216-839-7238 or by e-mail at rachael.barbour@basf.com by **5 pm** on **Friday, January 11** (for phone reservations, please clearly spell your last name and leave a return phone number). Cost of the dinner is \$20 for members & guests and \$10 for students. Checks made out to "Cleveland ACS" are greatly appreciated. Vegetarian meal requests should be directed to Rachael Barbour. The dinner will include chicken breast stuffed with spinach and herbed cheese, Yukon gold whipped potatoes, green beans, spinach salad, carrot cake, coffee, iced tea, and water.

Cleveland Section Web Site:  
[http://www.csuohio.edu/cleveland\\_acs/](http://www.csuohio.edu/cleveland_acs/)

## Directions to Mather Mansion

2121 Euclid Ave.  
Cleveland, OH 44115



**From the South (I-77).** Follow I-77 north to the East 22nd/East 14th Street exit (#162B) to East 22nd Street. Turn left onto East 22nd Street; drive several blocks to Euclid Avenue, and turn right. Continue on Euclid and watch for the CSU Visitor Parking Lot on your right.

**From the South (I-71).** Follow I-71 north to the East 22nd Street exit (#172B). Turn left onto East 22nd Street; drive several blocks to Euclid Avenue, and turn right. Continue on Euclid and watch for the CSU Visitor Parking Lot on your right.

**From the East (I-90).** Follow I-90 west to the Chester Avenue/CSU exit (#173B). Turn left onto East 24th Street and left at the light onto Chester. Take Chester to East 30th Street, turn right. After one block, turn right onto Euclid Avenue and proceed west across the bridge. Look for the Visitor Parking Lot on your left.

**From the West (I-90).** Follow I-90 east to the East 22nd Street exit (#172C). Turn left onto East 22nd Street; drive several blocks to Euclid Avenue, and turn right. Continue on Euclid and watch for the CSU Visitor Parking Lot on your right.

## Speaker Bio

KATHRYN S. KALASINSKY received her B.S., M.S., and Ph.D. degrees from the University of South Carolina. She has over 25 years experience in the fields of environmental and forensic toxicology. She recently entered the field of microbiology where she is currently exploring spectroscopic methods of bioterror detection. After many years of service in state government and industry, Dr. Kalasinsky began working for the federal government at the Armed Forces Institute of Pathology in 1991 where she became Chief of Research and Education for the Division of Forensic Toxicology in the Office of the Armed Forces Medical Examiner. Dr. Kalasinsky is well known for her many applications of spectroscopy to solving forensic problems primarily for drugs of abuse questions. She is currently the Chief of Optical Spectroscopy in the Division of Microbiology in the Department of Infectious and Parasitic Diseases Pathology at the Armed Forces Institute of Pathology. She has over 200 publications and presentations in the field and is currently serving on the editorial boards of two spectroscopy journals. Dr. Kalasinsky has served as President of the Coblenz Society and the Society for Applied Spectroscopy. She is the recipient of the 1995 Irving Sunshine Award for Outstanding Research in Forensic Toxicology from the American Academy of Forensic Sciences.

## Election Results

*Chair-elect:* **David Ball**

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*Alt Councilor:* **Mark Waner**

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**Case Western Reserve University**  
**Department of Chemistry**  
*Spring 2008 Chemistry Colloquia & Frontiers Lectures*  
*4:30 p.m. Clapp Hall, Room 108*  
*Visitors are welcome for coffee and cookies at 4:15.*

Date	Title	Speaker Institutional Affiliation
January 17	<b>Electrochemical Synthesis of Inorganic Materials with Controlled Micro- and Nano-Structures</b>	<b>Kyoung-Shin Choi</b> Purdue
January 24	<b>All The Ways to Have a Bond</b> <b>(Frontiers in Chemistry Lecture)</b>	<b>Roald Hoffman</b> Cornell U.
January 31	<b>There Are No Chemical Bonds, Just Bonded Atoms</b> <b>(Frontiers in Chemistry Lecture)</b>	<b>Richard Bader</b> Mc Master U.
February 7	<b>Designing Safe Electrochemical Couples for High Energy/High Power Lithium-Ion Batteries</b> <b>(Frontiers in Chemistry Lecture)</b>	<b>Michael Thackeray</b> Argonne National Lab.
February 14	<b>Using Silicones to Control Dynamic Interfaces: Silicone Biomaterials to Gold Crystals</b>	<b>Michael Brook</b> McMaster U.
February 21	<b>The Structure of Biological Molecules In and Out of Water: Combined Mass Spectrometry, Optical Spectroscopy and Computation Studies</b>	<b>Rebecca Jockusch</b> U. of Toronto
February 28	<b>Metal Cyanide Clusters that Display Single Molecule Magnetism</b> <b>(Frontiers in Chemistry Lecture)</b>	<b>Kim Dunbar</b> Texas A.&M. U.
March 6	<b>Chlorine: Element from Hell or Gift of God?</b> <b>- Nature's Amazing Role in the Organohalogen Controversy</b>	<b>Gordon Gribble</b> Dartmouth College
March 20	<b>New N~P and N~C Chelating Ligands for Applications in Hydroamination Catalysis</b>	<b>Joseph A. Schmidt</b> U. of Toledo
March 27	<b>Metallo-<math>\beta</math>-lactamases: Novel Weaponry for Antibiotic Resistance in Bacteria</b>	<b>Michael Crowder</b> Miami U. Ohio
April 3	<b>Designer Trioxanes for Chemotherapy of Malaria and Cancer</b>	<b>Gary Posner</b> Johns Hopkins
April 10	<b>Studies of Organometallic Reaction Steps in Homogeneous Catalysis</b> <b>(Frontiers in Chemistry Lecture)</b>	<b>Karen Goldberg</b> U. of Washington
April 17	<b>Polychromophoric compounds for photogeneration of bioactive agents. Photochemical strategies for NO delivery</b>	<b>Peter Ford</b> U.C. Santa Barbara
April 24	<b>New Metal-Metal Bonds</b> <b>(Frontiers in Chemistry Lecture)</b>	<b>Philip Power</b> U.C. Davis

## Local Company Highlight

GrafTech International Holdings Inc.  
By Richard L. Middaugh

In 2003, the former Union Carbide labs on Snow Road in Parma were recognized as A National Historic Chemical Landmark for the invention of High Performance Carbon Fibers in the late 1950's ([http://www.csuohio.edu/cleveland\\_acs/landmarks/HighPerfCarbon.pdf](http://www.csuohio.edu/cleveland_acs/landmarks/HighPerfCarbon.pdf)). Following is a current profile of GrafTech International, corporate successor to the Union Carbide Carbon Products Division.

GrafTech International Holdings Inc. (<http://www.graftech.com/>) is one of the world's largest manufacturers of high quality graphite and carbon based products. Headquarters and R&D labs are on Snow Road in Parma and local production is at 117<sup>th</sup> and Madison Road in Cleveland. Other domestic production sites are in Tennessee and West Virginia.

GrafTech manufactures graphite electrodes, carbon refractory systems, thermal management products, fuel cell and other specialty graphite and carbon products for the steel, electronics, power generation, semiconductor, transportation, petrochemical, and other metals markets. Most of their products are made from other peoples' waste: petroleum coke that remains after

petroleum refining and coal tar pitch remaining after metallurgical coking for blast furnaces. Graphite electrodes used in carbon arc furnaces to reclaim scrap steel are the largest product line. Carbon refractory products are used in high temperature applications too extreme for conventional ceramics. Thermal management products exploit the high thermal conductivity that can be achieved with certain natural graphites to eliminate hot spots in electronics for computer and automotive applications. Carbon foams are used as mold materials for specialty aerospace tooling, and expanded graphites are processed into flexible graphite sheets. Newer products include flow field plates for fuel cells that are currently in use in fork lift trucks receiving extensive trial in some Wal-Mart warehouses. President Bush got a gee-whiz look at one of these fork lift trucks operating in a July, 2007 visit to GrafTech headquarters (<http://www.graftech.com/getdoc/b8a64fca-d4eb-44f8-b29c-542c1758cb84/President-Bush-GTI-2.aspx>). (The carbon fibers business was sold to Amoco in the late 1980's.)

GrafTech has been honored with R&D 100 awards in each of the last 5 years. *e.g.*, the 2003 award (<http://www.rdmag.com/ShowPR.aspx?PUBCOD E=014&ACCT=1400000100&ISSUE=0409&RE LTYPE=PR&ORIGRELTTYPE=FE&PRODCOD E=00000000&PRODLETT=V>) was for

## January Historical Events in Chemistry

By Leopold May

The Catholic University of America, Washington, DC

- |                  |   |
|------------------|---|
| January 4, 1891  | Henry H. Dow prepared bromine from brine on this date.  |
| January 15, 1785 | William Prout who suggested that all atomic weights were multiples of weight of hydrogen (Prout's Hypothesis), was born on this day. He also identified hydrochloric acid in the stomach.   |
| January 20, 1758 | Two hundred and fifty years ago, Marie Anne Paulze was born on this date. She was a research assistant, collaborator, illustrator, editor, publisher, and spouse of Antoine Lavoisier. After he was guillotined, she married but was not a collaborator of Benjamin Thompson, Count Rumford. She wrote, "I take down the observations and make the illustrations in his laboratory notebooks. I am comfortable in English and Latin." |
| January 30, 1949 | This is the birth date of Peter Agre who shared the 2003 Nobel Prize with Roderick MacKinnon who was awarded the prize for structural and mechanistic studies of ion channels, was born on this date. He was awarded it for the discovery of water channels.  |

development of a Natural Graphite Composite Heat Sink for more efficient cooling of high-performance computer chips and power devices. This product matches the performance of heavy, costly copper solutions but at a fifth of the weight and a quarter of the cost. Compared to aluminum, the graphite heat sink has a 70% higher thermal conductivity, thereby allowing lower chip operating temperatures and faster processor speeds. Additionally, it is nearly a third lighter and comparable in cost.

Natural graphite is the mineral form of graphitic carbon and occurs worldwide. The graphite crystalline structure is typically described as having two axes or directions, with thermal properties that are highly directional. This high degree of structural anisotropy makes natural graphite an ideal starting material for heat sinks. In the manufacture of the graphite sheets, the natural graphite flake is treated with an oxidizing agent to form an intercalated compound with graphite, where the graphite layers are separated, producing nearly isotropic properties. This allows the production of a material where the relative amounts of heat flowing in different directions can be controlled.

In 2004, the award was for SpreaderShield (<http://www.rdmag.com/ShowPR.aspx?PUBCODE=014&ACCT=1400000100&ISSUE=0409&RELTYPE=PR&ORIGRELTYPE=FE&PRODCODE=00000000&PRODLETT=V>), a related product that leverages the thermal conductivity anisotropy to conduct heat away from hot spots in laptops but without conducting it to the bottom of the case and your lap.

Helen Mayer, a project manager at GrafTech, leads the Archives Committee of the Cleveland section of the American Chemical Society and contributed or clarified much of the information above. The Archives Committee web page ([http://www.csuohio.edu/cleveland\\_acs/archives.htm](http://www.csuohio.edu/cleveland_acs/archives.htm)) has links to this and other ACS National Chemical Landmarks citations for the Cleveland area.

## **Call for Nominations: Heller Award**

By Kenneth W. Street

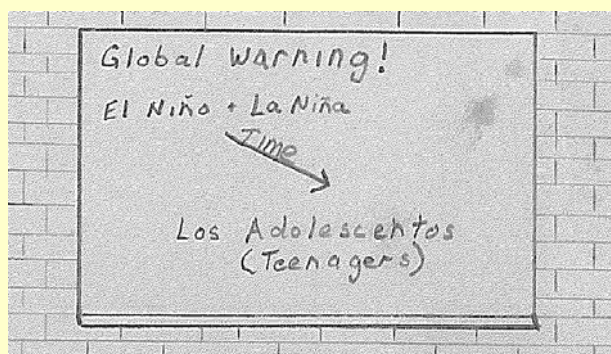
The Cleveland Section of the American Chemical Society annually sponsors an award to recognize an outstanding high school chemistry teacher in the Cleveland Section. The award consists of an honorarium of \$1,000 and a framed certificate. The award is named for Irene Heller of North Olmsted High School in recognition of her contributions as an outstanding high school chemistry teacher and her service to the Cleveland Section.

Nominations for the award should be presented to Kenneth Street, NASA-GRC, MS- 23-2, 21000 Brookpark Road, Cleveland, Ohio 44135 by close of business Thursday, March 13, 2008. The nominations should consist of information on the candidate's education, professional experience and activities, awards and honors, offices held and specifics on significant contributions. The letter of nomination should highlight these significant contributions. Seconding letters are suggested. Nominations should be sponsored by at least one member of the Cleveland Section. If you do not know a local section ACS member willing to serve as Champion for your candidate, contact Ken Street and he will provide one for you. The Cleveland Section is geographically confined to the counties of Cuyahoga, Geauga, Lorain, Medina, Huron, and Erie. Nominators of candidates who work outside of these counties may contact the Cleveland Section of the American Chemical Society for more information about High School Chemistry Teacher Awards. A detailed curriculum vita of the candidate may also be included. Electronic nominations using Word Files mailed to [kenneth.w.street@nasa.gov](mailto:kenneth.w.street@nasa.gov) will be greatly appreciated. Ken Street may be contacted at 216-433-5032 during business hours for assistance with submissions.

The award will be presented at the April 16, 2008 meeting of the Cleveland Section.

## Science Humor

By Daniel A. Scheiman



## Meeting in Miniature - March 19, 2008

By Manish Mehta

*Call for Papers:* The annual Meeting in Miniature will be held on Wednesday, March 19, 2008 at Oberlin College. The afternoon generally will consist of oral presentations, a plenary lecture, followed by dinner and award presentations. The plenary lecture, to be presented by Charles L. Brooks III, the Warner-Lambert Professor of Chemistry and Professor of Biophysics at the University of Michigan, will be titled "Springs and things: Exploring the origins of robustness in Nature's molecular machines with multi-scale models." Professor Brooks' research, at the Scripps Research Institute and now at the

University of Michigan, focuses on large, multi-scale computational models of biological macromolecules, such as molecular motors and membrane proteins.

Abstracts for presentations can be submitted by email only as a Microsoft Word documents (we cannot guarantee that any other format can be properly translated) to Prof. Manish Mehta, program chair, at [manish.mehta@oberlin.edu](mailto:manish.mehta@oberlin.edu). Abstracts must be submitted no later than February 15, 2007. Monetary awards for best undergraduate and graduate student oral presentations will be given, so encourage your students to participate.

Questions about paper submissions can be directed to the program chair. In addition to oral presentations from undergraduate and graduate students, presentations from principal investigators are also encouraged.

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*Isotopics* is looking to highlight local chemistry professionals, companies, teachers, research groups, students, events, and more. If you have an idea for an *Isotopics* article, please contact the editor. *Isotopics* is also looking for local members to join our staff. Time commitments for staff members are minimal (a few hours a year!) and your contributions will be invaluable to our local section. If you are interested in joining *Isotopics*, please contact the editor.