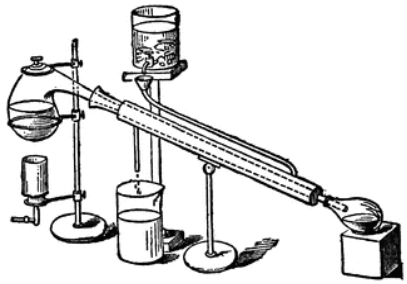
SOUTHWEST RETORT



SIXTY-EIGHTH YEAR **OCTOBER 2015**

Published for the advancement of
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and Chemistry in this area

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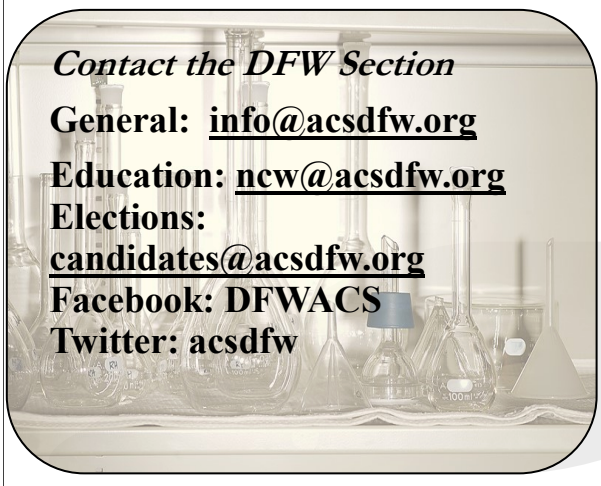

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EMPLOYMENT CLEARING HOUSE

Job applicants should send name, email, and phone, along with type of position and geographical area desired; employers may contact job applicants directly. If you have an opening, send your listing, including contact info for your company, to retort@acsdfw.org. Deadlines are the 7th of each month.

JENKEM TECHNOLOGY

The PEG and PEGylation Technology People

Job Title: Sales/Marketing Assistant

Name of Company: JenKem Technology USA Inc.

Nature of Business: Polyethylene Glycol (PEG) Polymers for Pharmaceutical and Biotech Applications

Job ID: JKUSA-20150501

Job Type: Full-time

Salary Range: Base salary $25,000.00 to $35,000.00; plus Sales Commission

Location: United States - Texas – Plano

Additional notes: Must be legally authorized to work in the United States. Local candidates preferred, no relocation benefits are provided for the position.

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Job Requirements: Bachelor's degree or higher (Chemistry/Biology/Biochemistry or similar background REQUIRED); Excellent interpersonal and communication skills; Excellent reading, speaking, and writing skills in business English; Good arithmetic skills and attention to details required; Proficiency in the use of Microsoft Word, Excel, PowerPoint, and Outlook required; English/Chinese bilingual preferred; Ability to work independently required.

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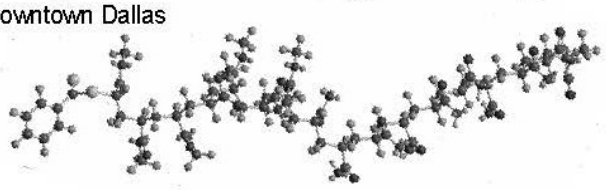

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FIFTY YEARS AGO IN THE SOUTHWEST RETORT

The October ACS tour speakers are **Dr. Robert S. Hansen** from Iowa State University and **Dr. Ralph L. Shriner** from SMU. Dr. Hansen will lecture from these topics, "Surface Films and Capillary Ripples," "Surface Chemistry of the Electrical Double Layer," and "Reactions on Clean Metal Surfaces." Dr. Shriner's possible topics are "Model Compounds in the Study of Lignin Chemistry," "Reaction of Olefins with Iodine Monochloride," and "Mutarotation of Optically Active Compounds."

In the Dallas-Ft. Worth area, **Dr. Norman G. Foster** has joined the faculty of Texas Woman's University. He comes from the U. S. Bureau of Mines Research Center in Bartlesville, OK, where he achieved recognition in mass spectroscopy. At TWU he will teach physical chemistry and continue research in mass spectroscopy. Two new faculty members at North Texas State University *(now UNT)* are **Dr. Ray Hurd** and **Dr. Leroy Theriot**. **Dr. Tom Brady** has received a two year NSF grant of $13,300 for research on halogenated ketenes. **Dr. Gordon Skinner** has received a three year NIH grant for $53,730.

The Baton Rouge ACS Section reports that **Dr. James G. Traynham** of LSU has received the section's Charles E. Coates Award, an annual award given to an outstanding chemist or chemical engineer in the section.

Dr. William L. Jolly of UC-Berkeley will be the speaker at the University of Arkansas ACS Section's October meeting. His topic will be "Reactions of the Electron and Protonic Acids in Liquid Ammonia." New faculty members at U of A are **Dr. Walter L. Meyer** and **Dr. J. W. Carmichael.**

The Baylor-Texas A&M ACS Section reports that Texas A&M has two new faculty members. They are inorganic professor **Dr. Gilbert P. Haight, Jr.** and instructor **Dr. Frank Smentowski.** Dr. Haight came from Swarthmore College in Pennsylvania, and Dr. Smentowski came from a post-doctoral appointment at Iowa State University. Dr. Smentowski will be setting up the new EPR laboratory. At Baylor, **Drs. John S. Belew** and **W. O. Milligan** attended the Fall National Meeting of the ACS held in Atlantic City.

The Southeastern ACS Section reports that new faculty members at the University of Houston are **Dr. Gerhard G. Meisels** from Union Carbide, who will do research in mass spectrometry, and **D. Mark Robert Willcott**, who will specialize in NMR.

The Central Texas ACS Section tells us that University of Texas faculty attending the Atlantic City ACS meeting were **Drs. M. J. S. Dewar, R. M. Roberts, A. H. Cowley, A. J. Bard, G. W. Watt, J. J. Lagowski,** and **G. H. Ayers.**

Contributed by

E. Thomas Strom

Thermoelectric Materials, Applications, and Limitations

By

John E. Spessard, PhD, PE

Thermoelectric materials provide electricity when heated. They are sources of electricity with no moving parts. This makes them very reliable. Today, thermoelectric materials are used to provide electricity in inaccessible locations such as underground pipe lines, unmanned sites and space probes. (Radioactive plutonium-238 is the usual heat source for space probes.) The converse applies in that application of an electric current produces a hot side and a cooler side. The cool side can be used as a refrigeration system with no moving parts.

The first thermoelectric materials were junctions of two dissimilar conductors. The present thermoelectric materials are highly doped semiconductors. One side has available electrons (n type). The other side has holes lacking electrons (p type). The material must be a good electric conductor and a poor heat conductor. There is a hot side and a cold (or cooler) side. The electricity provided is due to this temperature gradient and attention is provided to avoiding heat transfer from the hot side. The largest acceptable gradient is about 100C. Because heat generated on the hot side can flow to the cold side, thermoelectric materials work best at low current outputs such as about 6 amps. There can be multiple circuits in series. The workhorse material is bismuth telluride. The *C&EN* articles discuss newer materials with greater efficiencies. These include lead telluride, tin lead telluride, calcium manganese oxide and cobalt antimony compounds with added rare earths. These are not materials with the potential for becoming utility scale electric generators.

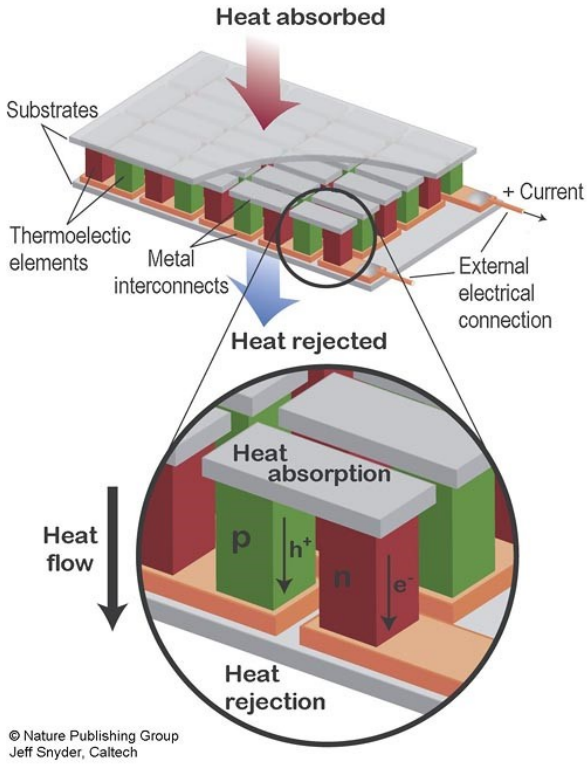
The greater temperature difference between the hot side and cold side of the thermoelectric material, the more efficient is the conversion of heat to electricity. Present day efficiencies for commercially available materials run about 5%. But due to thermal and electrical impedance, for that material in a working device, the attainable efficiency is 3 to 4%. This compares with a 20% efficiency for commercial solar panels and as high as 42% for some noncommercial and expensive materials.

The efficiency of thermoelectric materials is measured by ZT, the Figure of Merit. ZT is a dimensionless measure of energy conversion efficiency. A ZT of 1 is considered sufficient efficiency to be used in a working device. Some research stage thermoelectric materials have a ZT as high as 1.5 at 600C. These are too expensive for commercial use. There is a

report of a plasma sintered lead telluride having a ZT of 2.2. Clearly, solar panels at present are by far the more efficient.

Thermoelectric devices have been suggested as a method of recovering energy from relatively low temperature heat such as stack gases and automobile exhaust. My opinion is the capital cost is far too high.

Industry is well aware that relatively low temperature heat has potential value and contributes to thermal pollution. The relatively low temperature and the Second Law dictate that high recovery efficiency is unattainable. This heat should be recovered to the best economic extent possible and heat exchangers are widely used. A simple example is two concentric pipes. The inner pipe contains the hot stack gas and the outer pipe contains the incoming air used in a boiler or furnace. The warmer incoming combustion air reduces the fuel requirement to the boiler or furnace and renders it more efficient. Heat exchangers can be used to transfer energy from a liquid or gas to a liquid or gas. Heat could be used to boil a volatile liquid which could run an electric turbine. In all of these situations the limiting factor is: Does the energy savings justify the capital cost of the heat exchanger?



The thermoelectric material could be wrapped around the automobile exhaust pipe. About 32% of the energy in gasoline actually moves the car. The exhaust pipe gas has a temperature range of 400 to 600C. The exhaust heat is about 30% of the energy in gasoline. Some heat is lost through the radiator. (If the engine overheats, that is a real problem.) The electricity from the thermoelectric material would run the car's electric system, possibly eliminating the need for an alternator. An estimate is that this could improve gasoline mileage by 3%. Major automobile manufacturers are conducting research on exhaust heat recovery systems. No present system is economically feasible but the applications of using the heat to boil a volatile liquid with the gas operating an electric turbine at present is the more promising. The cost and low efficiency of presently available thermoelectric materials are large negatives.

The academic research has a target of greater efficiency. Industrial research has the target of acceptable efficiency at an acceptable price.

...And Another Thing…

by Denise L. Merkle, PhD

Led Around by the Noes

The earth is flat and revolves around the sun; Humans are governed by humors[1] (I'll take fire, thank you); Atoms just stay together; We can see all the universe —with our eyes, from Earth; Doctors would never harm their patients —there's no way they'd transmit disease; Transposons? How silly; Genetics? Can't happen; Stomach ulcers are cured by antacids and milk. Facts. *Formerly* facts. Now Myths.

We are scientists: researchers, educators, writers, editors, lab technicians and beyond. Whatever we became in our pursuit of truth, we hold certain tenets close. Yet, although we seek truth, we as humans define ourselves by what we know, and by what we *believe*. We are influenced also by what those around us believe.[2] Who hasn't been frustrated into teeth gnashing by a colleague (or worse, a collaborator, or most grievously a grant reviewer) whose response to a well-developed proposed experiment is 'No'? No. Can't be. No one else thinks it's so. No. It's an immediate response to almost anything, even from *scientists*: No.

Well, hold that No. Don't bring it into existence. No is damaging. It's worse for the world than all the Helicobacter in a gut. Because people like No. They cling to No, in the face of all evidence that Yes! is the correct response. No permits their worlds to revolve around something stable, if those worlds revolve at all. Changes, ideas, revision of accepted doctrines, and knowledge itself are all prevented by No. Not only does No allow security aka stagnation, No permits the vilification and minimization of those who encourage Yes. Agree with Copernicus that, in fact, we live on a heliocentric orb? Live in house arrest for life. Demonstrate genetics through statistically significant data resultant from decades of meticulous research? Witness the repeated dismissal of your conclusions and die before anyone recognizes your genius. Figure out the cause of nearly every case of ulcers and their delinquent offspring, gastric cancer? Watch as your incredible medical accomplishments are ignored, your scientific expertise becomes a laughingstock, and patients die because no one will listen to you.[3] At least Drs. Barry Marshall and Robin Warren were not institutionalized, as were some visionary scientists and inventors.[4]

What is the point of all this, you may ask? The point is that People Who Think should use No to mean only that. No. Not, 'I have never heard this before so I don't know how else to react. No.' or 'Wow. Unique concept. Novel. No.' Say No *after* the data have been analyzed and assessed, after a thoughtful consideration of what is proposed, after, and only after, it is known that Yes is incorrect. Say No to Crowd thought, peer pressure, urban myth, urban legend, anecdotal evidence, blindly touted ideologies, persistent falsehoods, and any person, place or thing perpetuating untruths and unsubstantiated conclusions as fact, especially if those false conclusions are used to bolster

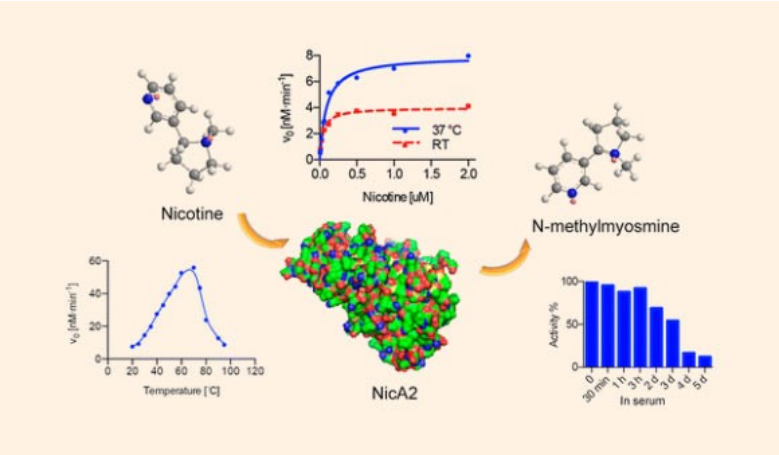
Continued on page 25

From the ACS Press Room

Nicotine-eating bacteria could one day help smokers kick the habit

A New Strategy for Smoking Cessation: Characterization of a Bacterial Enzyme for the Degradation of Nicotine
Journal of the American Chemical Society

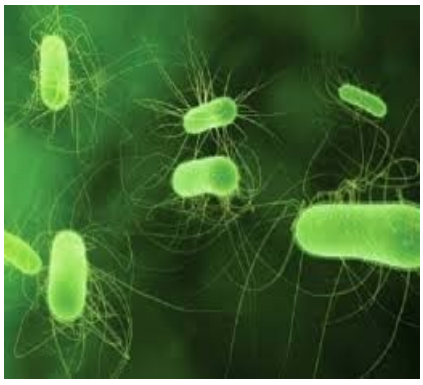
Most people who smoke cigarettes know it's bad for their health, but quitting is notoriously difficult. To make it easier, scientists are taking a brand-new approach. They are turning to bacteria that thrive on nicotine, the addictive component in tobacco. In ACS' *Journal of the American Chemical Society*, they report successful tests on a bacterial enzyme that breaks down nicotine and could potentially dull its effects in humans.



Tobacco use remains the leading cause of preventable disease, disability and death in the U.S. Smokers who want to quit can turn to various pharmacological aids. These include patches, gum and other nicotine-releasing products designed to replace cigarettes, as well as drugs that sequester nicotine in the body to prevent it from reaching the brain, where its addictiveness takes hold. But the success rates of these options are low. Only about 15 to 30 percent of smokers who try them are able to stop smoking for longer than one year. Kim D. Janda and colleagues wanted to try a new angle.

The researchers used an enzyme called NicA2 that comes from *Pseudomonas putida*, a kind of bacteria already known to degrade tobacco waste. In lab tests, NicA2 broke down all the nicotine in blood samples within 30 minutes. It also remained stable for more than three weeks in a buffer solution, at least three days in serum, and mice given the enzyme showed no observable side effects.

The authors acknowledge funding from the Skaggs Foundation.



Psuedomonas putida

Join us for Our Winter Event!

Thursday
December 10, 2015
7:30pm – 10:30pm
Arts 5th Avenue
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THE PROGRAM IS STILL IN THE PLANNING STAGES BUT WILL BE VERY INTERESTING!

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www.fwlsc.org

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FWLSC is a non-profit grassroots organization founded to educate, & to promote & support all aspects of Metroplex Life Sciences. Informative and Interesting programs in a jazz club setting.

DFW Councilor's Report

250th American Chemical Society National Meeting
by Linda Schultz

On August 16-20 I was privileged to represent the Dallas – Ft Fort Worth Local Section at the Fall 2015 National Meeting in Boston, along with my fellow Councilors Tom Strom and Mary Anderson. As always, it was an impressive and well-organized event, as one would expect from the world's largest scientific society. As of Wednesday, August 19, official attendance was 13,888; the Exposition had 475 booths with 325 exhibiting companies; and 9,271 papers had been accepted. The weather was beautiful, the city was hospitable, and there were numerous historic sites to visit and explore. The only complaints I heard were that it was more expensive than many of us are accustomed to, and the various meeting venues were so widely separated that it was impossible to attend many events because you could not physically get from one to another in less than 30 minutes. Fortunately the ACS shuttle service worked well, but it still seemed that I spent half of my time waiting for or riding the buses. Maybe things will be better when ACS returns to Boston for the Fall 2018 meeting.

I do have to mention the one historical site that I did visit. I discovered that my hotel was within easy walking distance of the John F. Kennedy Museum and Library. Of course that is something that would prick the interest of any of us from the DFW area – especially those in my age group. I hiked over and found it to be a very worthwhile experience. It was an excellent portrayal of the world political environment of the 1960s, and the presentation of the events in Dallas was factual and not judgemental of Texas in any way. I highly recommend it.

I attended the open meeting of the Committee on Professional Training (CPT), which oversees ACS program certification. New Guidelines for accreditation of BS Programs were approved in March and include increasing the minimum number of faculty from 4 to 5, increased flexibility for faculty teaching loads, increased safety awareness, and required coverage in the certified degree of two of the following systems: "synthetic polymers, biological macromolecules, supramolecular aggregates, and meso- or nanoscale materials". Programs currently in the review process will be evaluated using the former guidelines.

The ACS Board of Directors discovered a few meetings ago that they could entice members into attending their open meeting by offering free lunch and an engaging speaker. In Boston it was George Whitesides from Harvard, who spoke on "Reengineering Chemistry", and it was a highly entertaining presentation.

Money is always a topic of interest. At the

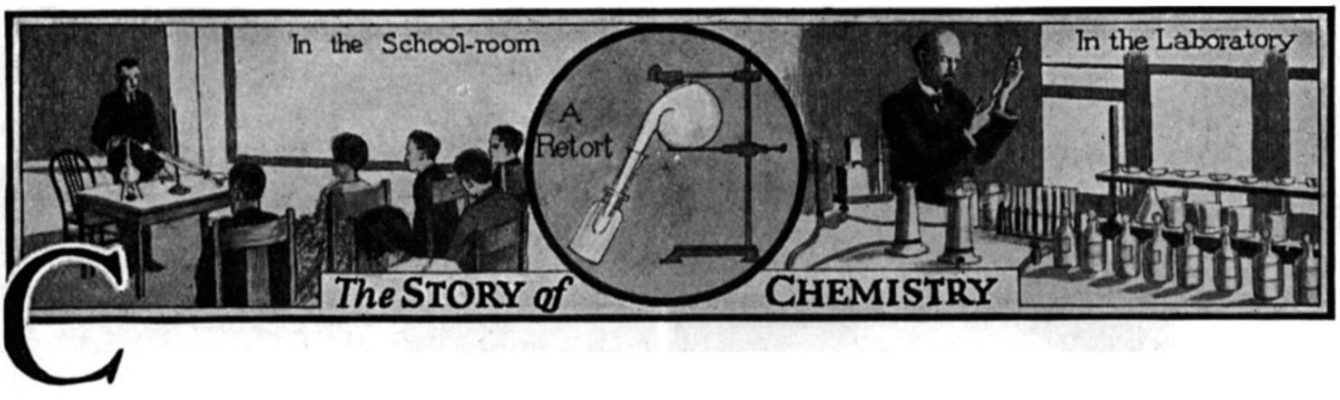
Council Meeting, the Committee on Budget and Finance (B&F) reported that the financial status of the ACS is currently in good shape, with most revenues coming from Information Resources and reduced expenses due to implementation of numerous cost-cutting measures. On the recommendation of B&F, the Board voted to approve an advance member registration fee of $415 for national meetings held in 2016. This fee is in line with that of similar professional societies, and the cost increase is primarily driven by the increased technological resources required for large meetings. Member dues for 2016 will be set at $162, an increase of $4 over 2015.

The committee on Economic and Professional Affairs (CEPA) reported that Domestic Unemployment among ACS member chemists increased slightly last year from 2.9% to 3.1%. However, the current unemployment rate is lower than it was from 2009 to 2013. The ChemCensus showed a modest salary increase year-over-year. For the first year since 2004, the percentage of ACS members working in manufacturing increased. There was a slight decline in the percentage of members in academia. Other workforce categories remained relatively flat.

The Membership Affairs Committee (MAC) reported that as of July 31, the ACS membership was 156,561; 2,055 fewer than on the same date in 2014. The Society's overall retention rate is 84%.

The Committee on Nominations and Elections (N&E) announced the results of selection of candidates of ACS Offices, but those of you who are reading this should have already received your ballots, so you know who these candidates are. I encourage you to exercise your right to vote and take advantage of the opportunity to provide input into the governance of ACS.

The next ACS National Meeting is in San Diego, CA, on March 13-17, 2016. I know that this seems a long distance into the future, but abstract submission is already open and some of the deadlines are as early as October 12! I hope to see you there.



DFW SECTION OF THE ACS

LETTER FROM THE CHAIR

Dear Colleagues,

On Tuesday, September 29th, our local section honored Dr. Daniel Armstrong of the University of Texas at Arlington with the annual Doherty Award. Dr. Armstrong

presented an engaging talk highlighting stories about his research through the years. Congratulations again, Dr. Armstrong!

Additionally, on Friday, October 2nd, our local section supported an alternative meeting hosted by Dr. Edward Donnay and the Abilene Christian University.

If there is any interest to hold meetings in various locations throughout the Dallas-Fort Worth section and funding support may be needed, please do not hesitate to contact myself or the chair-elect!

Upcoming events in our local section include a screening of ***The PhD Movie 2*** on October 26th. For more information about the movie and a movie trailer, please click this link:

http://www.phdcomics.com/movie/. Look for an RSVP link to hit your inbox soon!

On November 17th, we plan to honor our Schultz Award winner. More information to be announced closer to the event date.

The local section will take a holiday break for the month of December, but will resume in January with another Dallas Stars Hockey game. On January 23rd the local section has seats reserved to watch the Dallas Stars take on the Colorado Avalanche. This is a family friendly event and will include food and drink! I hope that many of you can come out to this social event and bring your families.

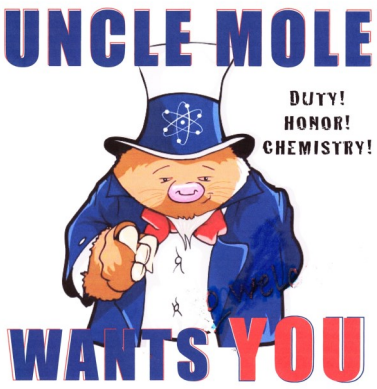
I encourage you all to attend one or all of these meetings. With such a diverse collection of meeting types, I am positive that we have something for everyone.

As always, if you have any questions or concerns, please feel free to contact me: **shana.marie.santos@gmail.com.**

All the best,

Shana Marie Santos, Ph.D.

Chair, DFW Section of the ACS



TO SEND YOUR ARTICLES, IDEAS, and VIDEOS to the SOUTHWEST RETORT!

ACS Chemistry for Life®

National Chemistry Week 2015 Illustrated Poem Contest: "Chemistry Colors Our World"

DEADLINE OCTOBER 30!

The **Dallas-Fort Worth Local** Section of the American Chemical Society (ACS) is sponsoring an illustrated poem contest for students in Kindergarten - 12th grade.

Contest Deadline: **Friday, October 30th 2015**

Prizes: **$10 Target Gift Card for the top winner in each grade category (K-2; 3-5; 6-8; 9-12)**

Winners of the **Dallas-Fort Worth Local** illustrated poem contest will advance to the ACS National Illustrated Poem Contest!

Write and illustrate a poem using the NCW theme, **"Chemistry Colors Our World"**. Your poem must be **no more** than 40 words, and in the following styles to be considered:

HAIKU • LIMERICK • ODE • ABC POEM • FREE VERSE • END RHYME • BLANK VERSE

Participants are encouraged to explore topics related to:

- Dyes and pigments
- Absorbed and reflected light
- The chemistry of fireworks
- Natural and artificial colors
- Any other relevant topics

Entries will be judged based upon:

- Relevance to and incorporation of the theme
- Word choice and imagery
- Colorful artwork
- Adherence to poem style
- Originality and creativity
- Overall presentation

National Chemistry Week
AMERICAN CHEMICAL SOCIETY
Solutions for the Future

Contest Rules:

- Poems must conform to a particular style. No poem may be longer than 40 words.
- The topic of the poem and the illustration must be related to the NCW 2015 theme, **"Chemistry Colors Our World"**.
- All entries must be original works without aid from others.
- Each poem must be submitted and illustrated on an unlined sheet of paper (of any type) not larger than 11" x 14". The illustration must be created by hand using crayons, watercolors, other types of paint, colored pencils or markers. The text of the poem should be easy to read and may be printed with a computer, before the hand-drawn illustration is added, or the poem may be written on lined paper which is cut out and pasted onto the unlined paper with the illustration.
- Only one entry per student will be accepted.
- All entries must include an entry form.
- All illustrated poems and/or digital representations of the poems become the property of the American Chemical Society.
- Acceptance of prizes constitutes consent to use winners' names, likenesses and entries for editorial, advertising and publicity purposes.

American Chemical Society

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TinyUrl.com/DFWchemistry

From the ACS Press Room

A step toward clothing that guards against chemical warfare agents

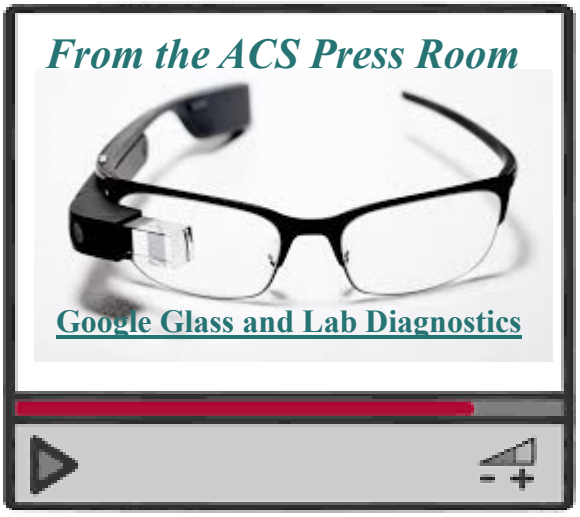
Nucleophilic Polymers and Gels in Hydrolytic Degradation of Chemical Warfare Agents
ACS Applied Materials & Interfaces

Recent reports of chemical weapons attacks in the Middle East underscore the urgent need for new ways to guard against their toxic effects. Toward that end, scientists report in the journal ACS *Applied Materials & Interfaces* a new hydrogel coating that neutralizes both mustard gas and nerve agent VX. It could someday be applied to materials such as clothing and paint.

Toxic chemicals have been used as weapons since ancient times, but it wasn't until World War I that they were released in large-scale attacks. Despite international efforts to ban them, chemical warfare agents (CWA) are still deployed. Scientists have developed some substances that can neutralize CWAs, but they lose their effectiveness when incorporated into practical coatings such as paint. Lev Bromberg, a research scientist in T. Alan Hatton's group, and other colleagues wanted to come up with a better solution.

The researchers developed hydrogel materials that completely broke down the nerve gas VX — one of the most dangerous and persistent CWAs — in less than 20 minutes. The materials also quickly degraded mustard gas and soman, a nerve agent that was reportedly used in the 1980s during the Iran-Iraq war. And, the researchers say, the hydrogels could be applied to fabrics or other materials without losing their ability to neutralize CWAs.

The authors acknowledge funding from the Defense Threat Reduction Agency.



From the ACS Press Room

Portable device can quickly test for sickness-causing toxins in shellfish

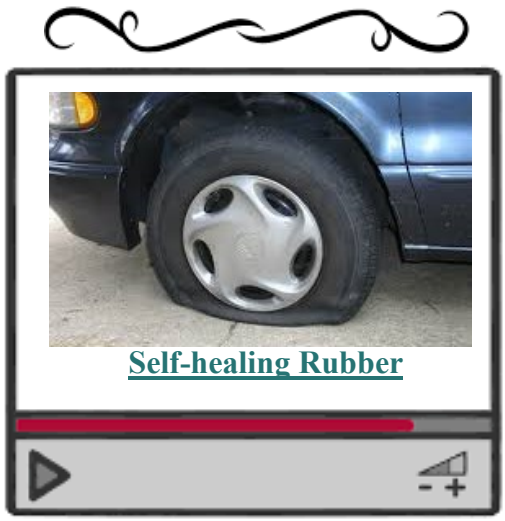
Development and Validation of a Lateral Flow Immunoassay for the Rapid Screening of Okadaic Acid and All Dinophysis Toxins from Shellfish Extracts
Journal of Agricultural and Food Chemistry

Mussels, oysters, scallops and clams might be ingredients for fine cuisine, but they can also be a recipe for diarrhetic shellfish poisoning (DSP). That's a gastrointestinal illness people can get if those tasty morsels contain marine toxins. Now, researchers are reporting in ACS' *Journal of Agricultural and Food Chemistry* the development of a portable, inexpensive device that can quickly and easily screen freshly caught shellfish for these substances.

DSP is caused by eating shellfish that have accumulated okadaic acid (OA) or related marine toxins. Algal blooms – commonly referred to as "red tides" – can produce these substances, which shellfish can accumulate through filter feeding. Because cooking the shellfish does not destroy the toxins, several regulations are in place to prevent the sale and consumption of tainted shellfish. To comply with these regulations, the current practice is to send samples to labs that use expensive, technically intense and slow tests. Waqass Jawaid and colleagues set out to develop an inexpensive, easy-to-use and portable device that maintained the rigorous testing standards of off-site labs but could quickly test shellfish on boats and at other remote locations.

The researchers adapted a test called a lateral flow immunoassay (LFIA), which is like a home pregnancy test strip. This LFIA combines simple test procedures with an antibody previously shown to specifically bind to three OA toxins. The small, portable device can accurately screen for presence of these substances in less than 20 minutes on a boat, before it goes further into the supply chain. If the test is positive, then the shellfish would not be sold. If the LFIA readout is negative, then an additional, easy-to-use test could be conducted dockside for "total toxins," which would include detection of a fourth type of OA.

The authors acknowledge funding from Innovate UK, Scottish Enterprise and Neogen Europe Limited.



From the ACS Press Room

How the "heat" compound from chili peppers could help kill cancer cells

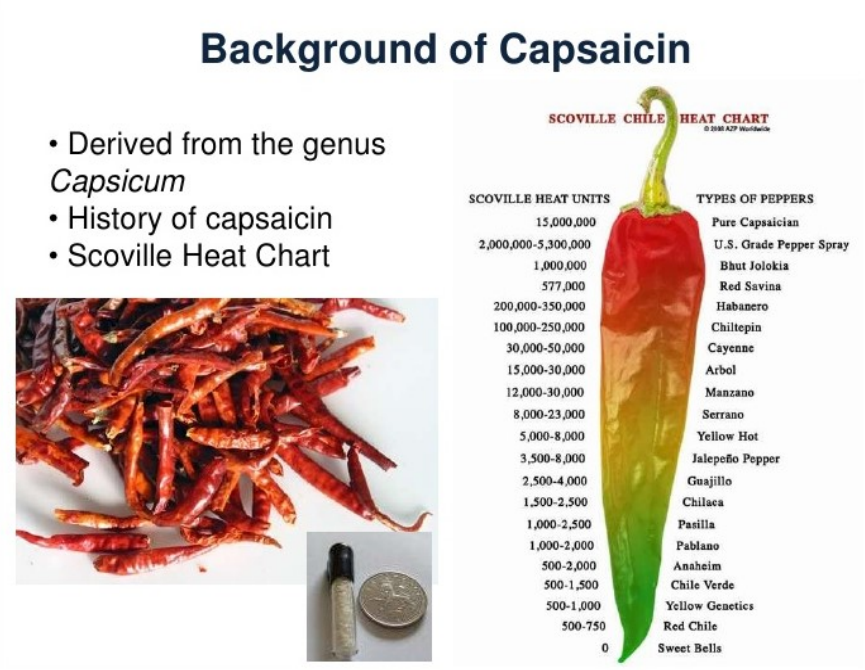
Location, Partitioning Behavior, and Interaction of Capsaicin with Lipid Bilayer Membrane: Study Using its Intrinsic Fluorescence
The Journal of Physical Chemistry B

Capsaicin, the compound responsible for chilis' heat, is used in creams sold to relieve pain, and recent research shows that in high doses, it kills prostate cancer cells. Now researchers are finding clues that help explain how the substance works. Their conclusions suggest that one day it could come in a new, therapeutic form. Their study appears in ACS' *The Journal of Physical Chemistry B*.

About 10 years ago, researchers reported that capsaicin can kill prostate cancer cells in mice while leaving healthy cells unharmed. But translating that dose to humans would require them to eat a huge number of chili peppers per day. Figuring out how capsaicin works could help researchers transform it into an effective drug in the form of an injection or pill. Researchers have figured out that the molecule binds to a cell's surface and affects the membrane, which surrounds and protects the cell. That finding prompted Ashok Kumar Mishra and Jitendriya Swain to try to gain a deeper understanding of capsaicin's effects so it might be harnessed in the future for new medicines.

The scientists were able to detect how the compound interacts with cell membranes by monitoring its natural fluorescence. The study showed that capsaicin lodges in the membranes near the surface. Add enough of it, and the capsaicin essentially causes the membranes to come apart. With additional research, this insight could help lead to novel tools against cancer or other conditions.

The authors acknowledge funding from the Government of India's Department of Science and Technology.



Around the Area

DFW Section

September Meeting: Doherty Award Winner Dan Armstrong (center) with Rasika Diaz (left) and Mike Twaddle, section Chair-elect.

Rasika Diaz, Dan Armstrong, Mike Twaddle

UT Dallas

The Department of Chemistry and Biochemistry welcomes two new Assistant Professors. Dr. **Sheena D'Arcy** was awarded her Ph.D. from the University of Cambridge and did her postdoctoral training at Colorado State University;
her research involves investigating the molecular basis of enhancer function in cell-specific gene expression and large protein assemblies that influence chromatin dynamics using biochemical, structural, and in vivo approaches.
Dr. **Gabriele Meloni** was awarded his Ph.D. from the University of Zurich and did his postdoctoral training at Aarhus University and the California Institute of Technology; his research involves investigating the bioinorganic chemistry of essential transition metals and metal-based drugs in biological systems by characterizing the structure, reactivity, and metal binding properties of soluble and membrane proteins and biomolecules involved in transition metal homeostasis.

Professor **Ray Baughman**, the Robert A. Welch Distinguished Chair in Chemistry and Director of the Alan G. MacDiarmid NanoTech Institute, received the Tech Titans Technology Inventors Award, which recognizes pioneering accomplishments, breakthrough ideas, and contributions to innovation and the community.

University of Arkansas

On the Go
Matt McIntosh gave a talk, "New Rearrangement Chemistry of the Breslow Intermediate" at the workshop on Accelerating Reaction Discovery of the Telluride Science Research Center, July 27-30, 2015, in Telluride, CO.
Zong, G.-H.; Aljewari, H.; Zhou, J.- H.; Du, Y.-C.; Shi, W. "Investigation of ipomoeassin F towards chemical proteomics" ACS meeting, Boston, MA, US, Aug 16–20, 2015.
Whisenhunt, L.; Zong, G.-H.; Aljewari, H.; Shi, W. "Conformationally-controlled late-stage modification to facilitate SAR studies of ipomoeassin F" ACS meeting, Boston, MA, US, Aug 16–20, 2015.

Barber, E.; Zong, G.-H.; Aljewari, H.; Shi, W. "Total synthesis and biological evaluation of the C-11 epimer of ipomoeassin F" ACS meeting, Boston, MA, US, Aug 16–20, 2015.

Feng Wang gave three invited talks: "Ab initio free energies for ion solvation from adaptive force matching." Feng Wang, Jilin University, Changchun, China, Aug. 10th, 2015. "Predicting solvation free energies of ions through adaptive force matching." Feng Wang, Dalian University of Technology, Dalian, China,
Aug. 8th, 2015. "MP2 solvation free energy of ions from simple pairwise potentials." Feng Wang, Free energy calculations: Three decades of adventure in chemistry and biophysics, Snowmass, CO, July 6th to July 9th, 2015.

Chen, J. "Plasmonic-magnetic nanorods for imaging and therapeutics." Pacifichem 2015 meeting, Honolulu, HI; Oral (Dec. 15 -20, 2015 invited talk).

Chen, J. "Understanding the interactions of theranostic gold-based nanostructures with complex biological environment." 2015 Joint Southeastern/ Southwest Regional Meeting, Memphis, TN; Oral (Nov 4-7, 2015, invited talk).

Publications

Chandrashekar, R; Adams, PD. NMR Spectroscopy Provides a Novel Bioanalytical and Biophysical Approach towards the Characterization of Protein Interactions Involved in the Integration of RAS Signaling. J Anal Bioanal Tech 2015, 6:5.

Zong, G; Barber, E; Aljewari, H; Zhou J; Hu Z.; Du Y; Shi WQ.* Total Synthesis and Biological Evaluation of Ipomoeassin F and its Unnatural 11R-Epimer. J. Org. Chem. 2015, in press.

Zonghua Ma, Jicun Li, Feng Wang. Continuous and Discontinuous Dynamic Crossover in Supercooled Water in Computer Simulations. J. Phys. Chem. Lett. 2015, 6:3170.

Bunnell, K; Lau, CS; Lay, JO; Gidden, J; Carrier, DJ. Production and Fractionation of Xylose Oligomers from Switchgrass Hemicelluloses using Centrifugal Partition Chromatography. J Liq Chrom & Related Tech 2015, 38(7), 801-809.

Packialakshmi, B; Liyanage, R; Lay, JO; Okimoto, R; Rath, N. Prednisolone-induced Predisposition to Femoral Head Separation and the Accompanying Plasma Protein Changes in Chickens. Biomarker Insight 2015, 10:1-8.

Jenkins, SV; Srivatsan, A; Reynolds, KY; Gao, F; Zhang, Y; Heyes, CD; Pandey, RK; Chen J. Understanding the Interactions between Porphyrin-Containing Photosensitizers and Polymer-coated Nanoparticles in Model Biological Environments. J Colloid & Interface Sci 2015, doi:10.1016/ j.jcis.2015.09.037.

Xia, J; Zheng, J; Huang, D; Tian, ZR; Chen, L; Zhou, Z; Ungar, PS; Qian, L. New model to explain tooth wear with implications for microwear formation and diet reconstruction. PNAS 2015, 112(34): 10669-72.

UT Arlington

Symposium on Oct. 19 to honor holder of Hamish Small Chair, Sandy Dasgupta

Thermo Fisher has generously funded a new Chair in the Chemistry Department to be titled the Hamish Small Chair in Ion Analysis. The Chair is named for renowned analytical chemist Hamish Small, and the first holder of the Chair is UTA's **Sandy Dasgupta**. The Symposium is Monday afternoon, Oct. 19, the first activity of UTA's special Chemistry Week (see more below).

The symposium's opening remarks will be made by UTA President **Vistap Karbhari**. This will be followed by brief additional remarks from **Evett Kruka** and **Chris Pohl** of Thermo Fisher. **Sandy Dasgupta** will introduce **Hamish Small**, who will then give the inaugural Small lecture. The remainder of the symposium will consist of 20 minute talks given by **Kannapolis Srinivasan**, Thermo Fisher; **Gary Christian**, University of Washington; **Charles Lucy**, University of Alberta; **Shaorong Liu**, University of Oklahoma; **Chris Pohl**, Thermo Fisher; and **Dan Armstrong**, UTA. A reception will follow at 5 p.m.

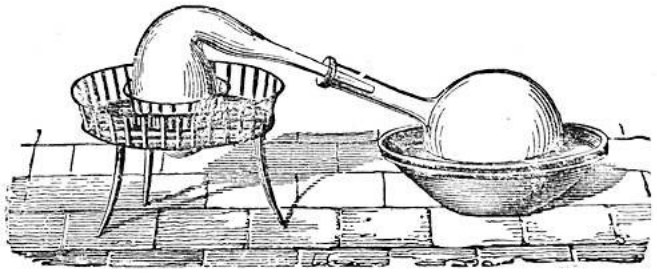
Faculty Activities

Dr. **Brad S. Pierce** has received a $333,810 NIH grant to study mammalian and bacterial cysteine dioxygenase. Dr. **Kevin Schug** gave invited lectures at the Sino American Pharmaceutical Association Conference in Shanghai and Beijing, China, last month as well as a talk at the annual HPLC conference in Beijing.

Chemistry Week at UT Arlington

This fall marks the 50th anniversary of the creation of the UTA College of Science. The anniversary is being celebrated by the various departments holding special anniversary weeks. Chemistry and Biochemistry are celebrating during Oct. 19-23.

The kick-off event is the **Hamish Small Symposium** on Monday, Oct 19, described above. Tuesday afternoon will feature graduate and undergraduate student poster presentations. Faculty Feud, hosted by Carl Lovely, will be held during the noon hour on Wednesday. The Keith Crandell Lecture will be given at 3 p.m. on Thursday by Dr. **John Mitchell** of Argonne National Lab, whose talk will be "New Materials: What, Why,---and How?" Friday afternoon will feature tours of the department plus a special presentation at 3 p.m. on "History of Chemistry at UT-Arlington." The presentation will feature short talks by **Rasika Dias**, **Tom Cogdell**, **Marty Pomerantz**, **Ed Bellion**, and **Tom Strom**. The week will climax with a 6 p.m. dinner. Many retired, moved, and emeriti faculty will be attending as well as present faculty and spouses.



Appareil simple de distillation.

Send your seminar schedules for the semester or the year to the Southwest RETORT!

retort@acsdfw.org

FIVE QUESTIONS FOR…

October's 5Q participant is **Jorge Varela**, BA (Political Economy), Assistant Director for TECH Fort Worth and Associate Director of Entrepreneurship at the University of North Texas Health Science Center. Mr. Varela is a successful entrepreneur, who now focuses efforts on helping researchers, innovators, and founders launch and grow emerging technology businesses.

1. ***How old were you when you realized you wanted to be a scientist/wanted your chosen career?***

I was 15 when I made the decision that I wanted to own a company. At the time I figured it would be in the auto industry and I would take it public before age 30. I basically succeeded in my goal except that it was not the auto industry. About three years ago I was asked to join TECH Fort Worth, a non-profit. I thought they were crazy to ask but I gave it a try and found that I have a passion to help others become, and succeed as, entrepreneurs, something I never would have imagined as a career.

2. ***What aspects of your career do you most enjoy?***

The coaching and mentoring of companies is the favorite part of what I do. I consider myself a business startup junkie and to have 20-30 company CEOs that I am working with at any given time is an adrenaline rush. We don't instruct our clients. Instead we provide them the tools for them to learn for themselves while doing our best to keep them from making significant mistakes. Sometimes the tool is a story about where I or someone I knew failed in a similar situation. In many ways it is story telling which I absolutely love!

3. ***You are a serial entrepreneur and now assist others to commercialize their products. Is there a skill -or set of skills- that successful entrepreneurs must have? If yes, what are they?***

Successful entrepreneurship in my opinion is not driven by skills. I think the most important thing is a willingness to risk. It is not a skill but it is the underlying feature of every entrepreneurial endeavor. Second is a passionate belief in one's self as the person to drive the success. Third is a kind of skill: the ability to take "no" to mean "not yet". Fourth is the ability to convince others, whether early employees, investors, clients, distributors, spouses, etc., that this is something they need to be a part of.

4. ***Nothing's easy all the time. What is the most significant challenge to your enjoyment of your career?***

The greatest challenge is funding due to the disconnect between the non-profit's services and revenues. In short, we deliver our services to early stage founders and CEOs that do not have the money to pay market rate for those services. We then serve a second client, the sponsors and partners that

look to what we do to as a means to further their business typically in the form of cultivating future clients. In the case of some partners, like universities, we are helping them commercialize their IP. What is surprising is that local and state governments benefit the most because of the jobs and wealth that successful business bring yet they contribute the least to our programs. In the latter case, convincing local and state government to fund our programs is my greatest challenge.

5. *The ubiquitous 5th Question must be: Who is your Science Hero? And why?*

As a kid I was into comic book characters, most of whom were scientists or results of science gone bad. My favorite was the Flash and I kept thinking of experiments that I could do (I experimented a lot) to gain some superhuman powers to save the world. As a young engineering student that changed to Einstein as a role model in his ability to overcome his difficulties, Einstein is still my hero for everything he has accomplished as a physicist, a humanitarian, a philosopher, a comedian.

Thank you, Jorge Varela, for being the October 2015 5Q interviewee! For more information about accelerating business or developing innovations, contact TechFortWorth via **techfortworth.org** or **jorge@techfortworth.org**.

If you'd like to share your story via 5Q, contact us at the Southwest Retort to join the list of distinguished participants.
retort@acsdfw.org

And Another Thing….continued from page 10

an assertion - especially if acting on the assertion would lead to harm.

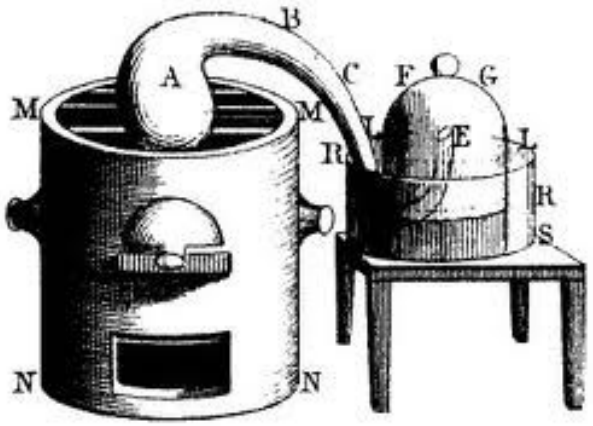
We are scientists. No should not be the first statement out of our mouths. The first thing that pops into our brains should be, 'Hmmm, I wonder what would happen if...'

[1]http://www.sciencemuseum.org.uk/broughttolife/techniques/humours.aspx

[2]http://theravenspoke.hubpages.com/hub/Crazy-Scientists-That-Caused-A-Revolution

[3]http://discovermagazine.com/2010/mar/07-dr-drank-broth-gave-ulcer-solved-medical-mystery

[4]http://amasci.com/weird/vindac.html

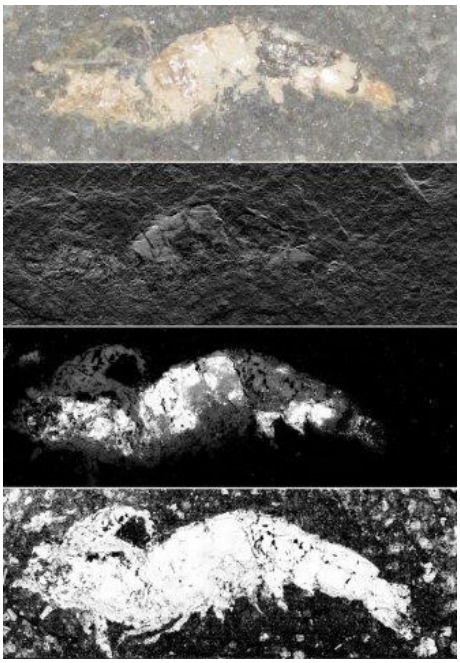


From the ACS Press Room

Unlocking secrets of how fossils form

Large-Field Electron Imaging and X-ray Elemental Mapping Unveil Morphology, Structure and Fractal Features of a Cretaceous Fossil at the Centimetre Scale
Analytical Chemistry

Fossils tell amazing stories and inspire them, too — just think of this summer's "Jurassic World" blockbuster. But because some of the processes that preserve fossils are not well understood, there's still more information that they could reveal. Now scientists report in ACS' journal *Analytical Chemistry* a new way to probe fossils to find out how these ancient remains formed in greater detail than before.



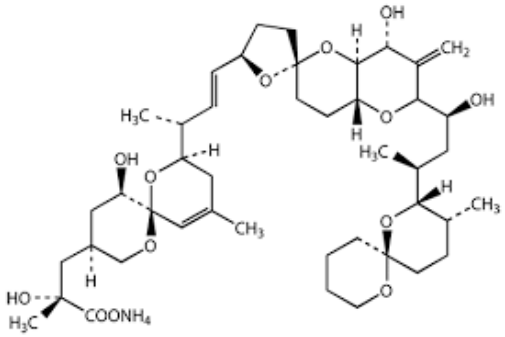
When most organisms die, they biodegrade and leave little behind. But if they get trapped in sediments that harbor few bacteria and loads of dissolved minerals, they can become fossilized and preserved for millions of years. Scientists use a variety of techniques on the ancient specimens to determine details about lifestyles and diets, as well as information about the geographical distribution of the creatures. One of those methods called scanning electron microscopy, or SEM, showed particular promise for revealing new information about fossils. So Amauri J. Paula and colleagues expanded on this method.

The researchers used a large-field SEM approach to analyze a shrimp fossil from the Araripe Basin, a place in northeastern Brazil known among paleontologists as a treasure trove of flying pterosaur remains. The shrimp specimen dates back to the Cretaceous period, when dinosaurs still roamed the planet. The technique provided evidence for the first time that a rare fossilization process occurred in the basin. It also showed that the fossil over millions of years developed a surprising fractal characteristic — a repeating pattern most commonly recognized in snowflakes but also found in structures as large as spiral galaxies.

The authors acknowledge funding from the Conselho Nacional de Desenvolvimento Científico e Tecnológico of Brazil and the Fundação Cearense de Apoio ao Desenvolvimento Científico e Tecnológico.

From the editor

In south Lousiana, where I grew up, the rule is 'no shellfish in months without R.' For a kid who scarfed down raw oysters with her dad at a New Orleans oyster bar, this was a rough rule. Our weekend trips to The City took place largely in June and July, when shellfish were forbidden. Of course I asked why, but nobody really knew why, back then. We did know that when the water was murky and warm and there was algae bloom, it was better to keep away from shellfish, no matter how pleasant slurping down the succulent bivalve. In fact, dinoflagellates produce the effect in warmer weather, the culprit being okadaic acid; dinoflagellates live in shellfish and sponges, too...we just don't usually eat the sponges.



In fact, okadaic acid, a fat-soluble ionophore, has been found to have numerous biological effects, as well as causing DSP (diarrhetic shellfish poisoning).

So, I was happy to see the article on the development of a quick test for okadaic acid. The test is a lateral flow immunoassay, like a pregnancy test strip, and the shellfish can be tested while still on the boat (and they probably can do it with Google glass: see page 17). (Question is: will they let me run the test in Brennan's or Antoine's?!)

While cruising the internet on this topic, I found a great paper in the open access journal ***Marine Drugs,*** entitled *Okadaic Acid Meet and Greet: An Insight into Detection Methods, Response Strategies and Genotoxic Effects in Marine Invertebrates (**OA Meet and Greet**).*

Best regards,
Connie