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A Newsletter of the Materials Research Society
Advancing materials. Improving the quality of life.

February 2012
Volume 12 • Issue 3

In this Issue!

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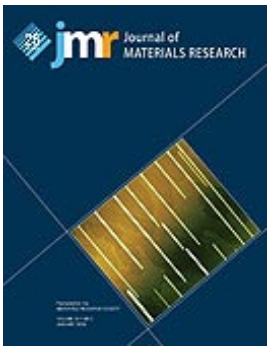


CALL FOR PAPERS
Journal of Materials Research (JMR)
Special Focus Issues

Although each issue of *JMR* covers a wide range of materials research topics, **special focus issues** allow the journal to provide a comprehensive look at the current research in a particular area of interest to its readers. The following topics will be featured in early 2013, but NOW is the time to learn more about these three focus issues and how you can submit a manuscript!

January 2013 - Silicon Carbide—Materials, Processing and Devices
Manuscript submission deadline, March 30, 2012

February 2013—Titanium Dioxide Nanomaterials
Manuscript submission deadline, May 7, 2012

March 2013—Silicon-based Nanoparticles for Biosensing and Biomedical Applications
Manuscript submission deadline, May 30, 2012

Nominations are due APRIL 1, 2012 for the following MRS Awards.

Don't delay. Nominate a colleague today for one of these four prestigious awards from the Materials Research Society. The nomination deadline is April 1.

The **Von Hippel Award**, the Materials Research Society's highest honor, recognizes those qualities most prized by materials scientists and engineers — brilliance and originality of intellect, combined with vision that transcends the boundaries of conventional scientific disciplines.

The **David Turnbull Lectureship** recognizes the career of a scientist who has made outstanding contributions to understanding materials phenomena and properties through research, writing and lecturing, as exemplified by the life work of David Turnbull.

The **MRS Medal** recognizes an exceptional recent achievement in materials research which is expected to have a major impact on the progress of any materials-related field.

The **Materials Theory Award** recognizes exceptional advances made by materials theory to the fundamental understanding of the structure and behavior of materials. This award is intended to honor both those who have pioneered the development of a new theoretical approach and those who have used existing approaches to provide significant new insight into materials behavior.

For more information on the MRS Awards Program, visit www.mrs.org/awards.

NEWS FROM THE WORLD OF MATERIALS

Keep up with materials research news through MRS!
Materials News Web Page | RSS feed | Twitter feed

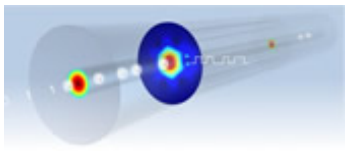
Materials in Focus

Embedding Electronics into Optical Fibers

Pennsylvania State University and the University of Southampton, U.K.

by Prachi Patel

Image caption: An international team built an optical fiber with a high-speed electronic junction -- the active boundary where all the electronic action takes place -- integrated adjacent to the light-guiding fiber core. Light pulses (white spheres) traveling down the fiber can be converted to electrical signals (square wave) inside the fiber by the junction. Image credit: John Badding's lab, Penn State University. Click image to enlarge.



By depositing semiconductors and metals inside the long, thin channels of a microstructured optical fiber, researchers at Pennsylvania State University and the University of Southampton in the UK have built high-quality electronic devices within the fibers.

Unlike previous methods to integrate devices inside fiber, the new technique works with many different types of semiconductor materials. The researchers, led by John Badding, a chemistry professor at Penn State, can also precisely dope the materials to create n-type and p-type semiconductors, which are butted together to make the junctions that form the basis of electronic devices. The advance, reported in *Nature Photonics*, could simplify and streamline fiber-optic telecommunications, spectroscopy equipment, and remote-sensing tools. "We're integrating a semiconductor junction with performance and characteristics that have never been possible in fiber," Badding says.

In fiber-optic systems, a silica fiber carries digital data encoded onto light pulses. On either end, however, semiconductor devices manipulate the light. One side has lasers that create light pulses and modulators that encode data, while the other side has detectors that convert the optical data to electrical signals. Coupling light between a hair-thin fiber and the light-guiding structure on a semiconductor chip is not easy, Badding says. Moving some of the chip-based devices into the fiber eliminates that coupling and makes the optic-electronic interface smoother, he says.

What's more, adds Pier Sazio, an optoelectronics researcher at the University of Southampton, embedding some electronic components inside the fibers makes the remaining electronic components of the system simpler and cheaper. "This is a new way of thinking about what you can do with an optical fiber," Sazio says. "Here the fiber becomes more of a device. You'll never remove the electronic interface, but [making] it more seamless has advantages."

Badding and Sazio start with pre-made microstructured fibers, also called photonic crystal fibers, which have arrays of nanometer-scale pores along their length. They can block some of these pores using epoxy glue, leaving desired ones open for making devices. Then they pump in a gas containing silicon, germanium, or platinum precursors at a high pressure. To dope these semiconductor materials, the researchers mix boron or phosphorus compounds into the gas. Heating the fiber creates a ring-shaped layer of crystalline material coating the surface of the pore.

The researchers deposit semiconductor and platinum layers one at a time to form concentric rings that act as device junctions. Badding says the process works because the pores are so narrow that the precursor molecules easily attach to their surface. "The precursor molecules are so close

together that if they weren't in a tiny hole they would just find each other and make a powder," he says.

The researchers have already made high-speed optical detectors that work at up to 3 GHz frequencies. They say that the technique could be used to make lasers and modulators as well. Other research groups have tried to incorporate electronics inside optical fibers by drawing the fiber out from cylindrical starting materials—either silica or polymer—that are embedded with semiconductor wires. This method is limited to using semiconductors that melt at the same temperatures as the fiber material, Badding says, and it does not allow for doping or making well-defined junctions.

Badding and his colleagues have been able to deposit compound semiconductors such as zinc selenide, which is used in lasers and light-emitting diodes. They're now working on using yet other materials and refining the devices. [Nature Photonics]

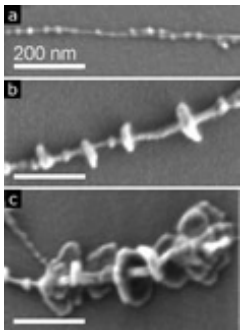
Nano Focus

Nano shish kebabs control pore size in buckypaper

Drexel University, Philadelphia

by Tim Palucka

Image caption: Three SEM images of *nano shish kebabs comprising a carbon nanotube as the skewer and polyethylene single crystals as the kebabs. Image credit: The American Chemical Society. Click image to enlarge.*



The shish kebab purportedly originated in medieval times when soldiers from Iran grilled meat on their swords over open fires. Now materials researchers from Drexel University in Philadelphia, Pennsylvania, have adapted the concept of the shish kebab on the nanoscale to control the pores size in "buckypaper." Traditional buckypaper consists of a thin film of pure carbon nanotubes. "We decorate a pure carbon nanotube with a polymer single crystal so that each tube will turn into a shish kebab," says Christopher Li, of the A.J. Drexel Technology institute. "We use the carbon nanotube as the shish [skewer], and we put a kebab [polyethylene single crystal] on it at various intervals, and we use these nanostructures to make buckypaper with a controlled pore size." They call the product nanohybrid shish kebab (NHSK) paper.

Traditional buckypaper is porous, but the pores are so small that doping the paper with functional groups to make it more electrically conductive is limited. This makes it less than ideal as a material for use in batteries and supercapacitors—applications for which buckypaper is being investigated. With NHSK paper, the kebabs serve as spacers to separate the carbon nanotubes; pore size is controlled by the spacers, which opens up the range of functional groups that can be placed in the pores to enhance conductivity.

The researchers fabricated the NHSK paper by ultrasonication of single-walled carbon nanotubes SWCNTs) in dichlorobenzene to separate the SWCNTS from the entangled bundles in which they usually reside. Polyethylene pellets were dissolved separately in dichlorobenzene and mixed with the SWCNT solution at 130 °C. When cooled to 88.5 °C, the polyethylene crystallized onto the SWCNTs to form the shish kebab precursor units. Free-standing NHSK paper resulted after filtering, rinsing, and drying in a vacuum dessicator for two days. For five batches with varying polyethylene contents, the average polyethylene kebab crystal diameter ranged from 17 to 94 nm, and the mean spacing between the kebabs was 35 to 68 nm.

This study, reported recently in *ACS Nano*, showed that conductivity of the NHSK paper increased with increasing wt% of SWCNTs, ranging from a conductivity of 2.64 S/cm for 13 wt% SWCNTs to 1930 S/cm for 100 wt% SWCNTs. An average pore size of 31 nm was measured for kebab-crystal spacing of approximately 50 nm. "You can put different functional groups within the pores so you can do nano-electrochemistry—without these pores your options are limited," Li says.

Of particular interest in this stage of the research was the wetting angle in contact with water, which reached 152.3 degrees for a 25 wt% SWCNT paper, making it superhydrophobic. Li says that the superhydrophobicity could enable the researchers to control the charging speed of batteries.

"This research shows that we can use this shish-kebab instead of the carbon nanotube itself to build a three dimensional membrane with controlled pore size, so this opens up a whole playground for using it for electrochemical devices," Li concludes. [ACS Nano]

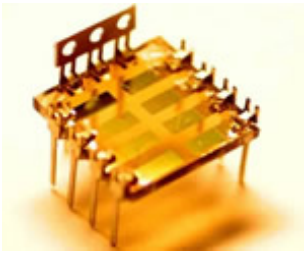
Energy Focus

Solar Cell Combines Singlet Fission with Infrared Absorption

Cavendish Laboratory of the University of Cambridge, U.K.

by Tim Palucka

Caption: Solar cell based on singlet fission and infrared absorption. Credit: University of Cambridge. Click image to enlarge.



Combining an organic material which produces two electrons from a single high energy (visible) photon with an inorganic material that absorbs low energy photons in the infrared region, may be a key to high efficiency solar cells. Researchers at the Cavendish Laboratory of the University of Cambridge, U.K., led by Neil C. Greenham, have reported the fabrication of a hybrid solar cell with pentacene as the organic component and lead sulfide (PbS) as the inorganic one in a recent issue of *Nano Letters*.

The group started by investigating the singlet exciton fission (one photon in, two electrons out) process in pentacene, which had shown promise as a solar cell with high internal conversion efficiency when combined with C_{60}. "On its own this process does not necessarily increase solar cell performance because at best it doubles the photocurrent but halves the maximum possible photovoltage," says Bruno Ehrler, a member of the Cambridge group. "It was therefore necessary to couple the fission active pentacene with an infrared absorber." Lead sulfide nanocrystals were chosen as the low energy infrared absorbing material.

The fabricated device consisted of an indium tin oxide (ITO) layer followed by a 50-nm-thick layer of pentacene. Nanocrystals of PbS were deposited on the pentacene using a layer-by-layer spin coating technique. Aluminum was then deposited as a top contact. In this configuration, photons entering the device through the ITO first encounter pentacene, which undergoes singlet fission in approximately 80 fs, so fast that it kinetically outcompetes alternative bulk decay channels. Because pentacene is transparent in the infrared, low energy photons pass through it and are simultaneously absorbed by the PbS layer. This mechanism distinguishes the device from conventional tandem solar cells, which require a pair of current-matched cells with transparent recombination layer; these requirements are eliminated in the pentacene/PbS hybrid cell. The combination of the photocurrents generated by the pentacene and PbS layers concurrently could lead to high conversion efficiencies.

"Due to the carrier multiplication process in these solar cells they could in principle circumvent the Schockley-Queisser limit," Ehrler notes, being careful to point out that their device is in the early stages of development and has not achieved high efficiencies yet. The cell has an internal quantum efficiency that exceeds 50% and a power conversion efficiency approaching 1%. As a further implication of this work, he says that "in principle, the pentacene can be combined with other inorganic materials in a solar cell, like conventional silicon solar cells." [Nano Letters]

MATERIALS FOR ENERGY BLOG

Join the conversation! Read the latest blog entries and let us know what you think by adding a comment.

Add your comments, or e-mail materialsforenergy@mrs.org to suggest future topics and contributors.

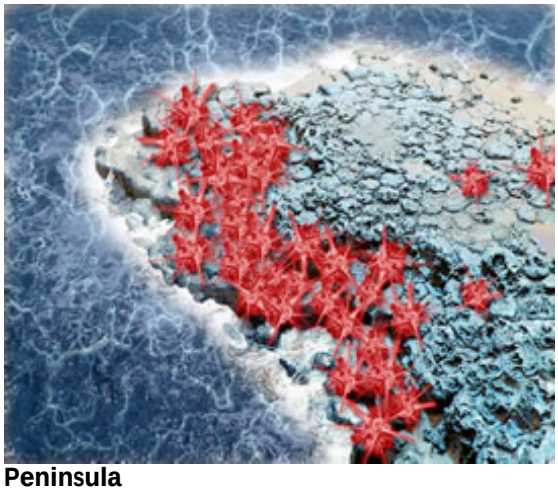
Materials Needed to Make Wind Work!

By Dr. Russell Chianelli, University of Texas at El Paso, Materials Research & Technology Institute

In the December issue of "Energy Quarterly" in MRS Bulletin, an article by Phillip Ball entitled "Wind on the Lakes" describes materials challenges for Great Lakes wind energy projects. Wind on the Great Lakes of the United States and Canada has a high potential for producing energy, but so far it has been ignored. One of the advantages of the freshwater Great Lakes is the absence of salt corrosion, which complicates ocean installations. Environmental issues concerning fisheries, birds, and natural habitats are also barriers to be addressed.

Better materials are also needed. This includes better rotor blades, as current plastic materials have problems with stability in the environment and poor mechanical properties. Rare earths are used in many of the energy generating and transmitting processes; finding replacement materials for these increasingly critical elements raises increasing economic and environmental issues. Finally, energy storage of produced electricity is a major sticking point for commercialization of wind energy. These are intriguing challenges for those of us working in materials for energy research.

Image in Focus



Peninsula

This picture was created from the convergence of a high resolution, plan view SEM image of zinc oxide "nanowall and nanowire structures" synthesized by metal-organic chemical vapor deposition. Color was added to the original image.

Credit: Byung Oh Jung, Sungkyunkwan University
(Click image to enlarge.)

(An entry in the Science as Art competition at the 2011 MRS Spring Meeting)

HAPPENINGS AT MRS

MRS News

Federal agency article brought to you by the MRS Government Affairs Committee (GAC)

Proposals Sought

Office of Naval Research
Basic Research Challenge
in
Carbon Molecular Electronics

The Office of Naval Research (ONR) is interested in receiving proposals for a Basic Research Challenge (BRC) Program on Carbon Molecular Electronics. The BRC program supports basic research and focuses on stimulating new, high-risk high potential payoff research projects.

The objective of this Basic Research Challenge (BRC) program is to encourage research and innovation in bottom-up chemical synthesis and assembly of carbon, particularly graphene, based electronic devices and circuits with atomic precision and Angstrom resolution. The program will pursue fundamental research toward building carbon based nanoelectronics from the molecular level up, using molecular synthesis, surface catalytic chemistry and other novel techniques.

Proposals should emphasize synthesis, characterization (both chemical and electrical) and atomic resolution imaging, of carbon nanostructures with increasing complexity. It is envisioned that the initial focus of the program will be synthesis of graphene nanostructures with controllable predetermined shape and atomically sharp edges, e.g., graphene nanoribbons (GNR) a few nm wide and longer than 100nm, and the ability to transfer them to non-metallic substrates. As the program progresses, the next levels of complexity will likely be synthesis of molecules that perform as graphene based circuit elements, and eventually, to rationally design and assemble them into "circuit molecules". In the long term, and possibly beyond this program, will be research on ways to interface the molecularly derived graphene circuit elements and circuits, and impedance match them, with top-down manufactured systems at mm scale. Also of interest to the BRC are opportunities to interface with other molecules, such as other carbon allotropes (CNT, C60 etc.), graphene derivatives (hydrogenated and/or fluorinated graphene) and other closely related non-carbon materials (hBN, Silicene, MoS2, etc.).

The total expected funding for this initiative is $6M over 5 years, likely split amongst 2 to 6 awards of different sizes and focused on different synthetic approaches. Proposers must submit their proposals in response to the ONR long range BAA (ONR BAA12-001) through grants.gov. ONR will not issue a separate Basic Research Challenge BAA. However, more details and a white paper submission process are described in ONR Special Notice 12-SN-0003 (http://www.onr.navy.mil/~/media/Files/Funding-Announcements/Special-Notice/12-SN-0003.ashx).

For more information, the technical contacts for this program are: Dr. Chagaan Baatar (chagaan.baatar@navy.mil) and Dr. Paul Armistead (paul.armistead@navy.mil).

This notice does not constitute an official solicitation by the Office of Naval Research. No information provided here supersedes any of the information in the posted long-range Broad Agency Announcement. The funding information provided represents the planned scope of the initiative and is subject to availability and acceptance of a suitable proposal. This notice does not constitute a specific commitment by the Office of Naval Research to provide any funds.

New photos on "Materials for Energy and Sustainable Development" LinkedIn group

Photo galleries for the 2011 World Materials Summit and Student Congress are available online now.

Comment on this posting and get connected to others involved with similar interests through the **Materials for Energy and Sustainable Development LinkedIn group**, http://www.linkedin.com/groups?about=&gid=4145169.

Of Interest to the Materials Science Community

DOE Announces $12 Million in Support of the Materials Genome Initiative

Last week, the Department of Energy's (DOE's) Basic Energy Sciences program announced a new $12 million program for advanced research projects in materials science as part of the President's Materials Genome Initiative (MGI) - an effort to halve both the time and money that it takes to move a new advanced material from lab to market. This new DOE program highlights the need for new, user-friendly software tools and data standards to strengthen the infrastructure for innovation of advanced materials. It also emphasizes the need for an experimentally-proven modeling paradigm that could speed the rate of discovery of new materials and shed light on their underlying physical structure and properties.

The DOE plans to allocate funds to software innovation centers and small-group research projects, as well as "glue funding," which brings together existing research activities to create interdisciplinary projects. The program also calls for research projects that maximize the utility of existing experimental technologies such as free electron lasers and advanced microscopy. Funding initiatives such as this strengthen our Nation's capacity for innovation in materials science, and pave the way for expansions in high-tech manufacturing industries.

NEW Conference and NEW Award!

IUMRS - MRS Singapore Young Researcher Award Nominations Due by April 30

The inaugural "International Union of Materials Research Societies - International Conference of Young Researchers on Advanced Materials (IUMRS - ICYRAM 2012)" organized by the Materials Research Society of Singapore (MRS Singapore) will be held at Biopolis, Singapore, during 1 - 6 July, 2012 (www.mrs.org.sg/icyram2012). In order to recognize the outstanding contributions made by young researchers on materials science, IUMRS and MRS Singapore have jointly instituted the "IUMRS - MRS Singapore Young Researcher Award." This award will be presented at the forthcoming IUMRS - ICYRAM 2012.

The nominee for this award must not have reached his/her 40th birthday on or before 1st July 2012. In the spirit of the true materials research, a nominee must have done interdisciplinary, innovative research demonstrating high level of excellence and distinction. The research work must have made a significant contribution to the development and fundamental understanding of the concerned topic as a whole. Find more details here.

International School of Solid State Physics

"Materials for Renewable Energy"
Erice (Italy), July 18th - 28th 2012

Sponsored by the Italian Ministry of Education, University and Scientific Research, the Materials Research Society and the European Materials Research Society.

The event will be hosted at the "Ettore Majorana Foundation and Centre for Scientific Culture". The school will review critical materials issues for the production and storage of renewable and sustainable energy. The aim of the School is to present the state-of-the-art and future perspectives in this critical area. It will be a great opportunity to bring together the international community of students, young scientists, and experts in a unique atmosphere for reciprocal benefits in terms of enthusiasm, knowledge and new ideas.

A maximum number of 100 students will be allowed. The contribution is 1000 € which includes lodging, meals, social events and transportation to and from Palermo and Trapani airports to Erice. The deadline for registration is May 31, 2012. Details and updates available here.

New Material Marvels videos available

Ainissa Ramirez has produced two more of her popular and informative videos on subjects of interest to materials scientists and to the general science audience:

Material Marvels with Ainissa Ramirez - Nanomaterials
http://youtu.be/jXwkO9AcXSA

Material Marvels with Ainissa Ramirez - Thermoelectrics
http://youtu.be/o6Y9TkaFTPY

Check them out and pass the links along to someone who would be interested in learning about these topics.

MEETINGS UPDATE

Critical Meeting Deadlines

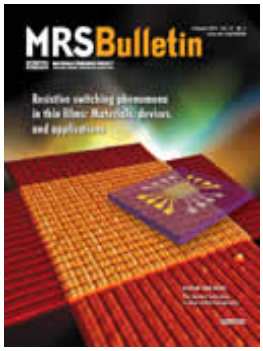
2012 MRS Spring Meeting & Exhibit April 9-13, 2012 San Francisco, CA	PREREGISTRATION OPEN Register by March 23 for discounted rates
2012 New Diamond and Nano Carbons Conference(NDNC 2012) May 20-24, 2012 San Juan, Puerto Rico	CALL FOR PAPERS Abstract Submission Deadline– 11:59 PM (ET), February 15, 2012
Electronic Materials Conference 2012 (EMC 2012) June 20-22, 2012 Pennsylvania State University, PA	REGISTRATION OPENS SOON
American Conference on Neutron Scattering (ACNS 2012) June 24-28,2012 Washington, D.C.	CALL FOR PAPERS Abstract Submission Deadline– April 2, 2012
2nd Global Congress on Microwave Energy Applications (2GCMEA 2012) July 23-27, 2012 Long Beach, California	CALL FOR PAPERS Abstract Submission Deadline– March 19, 2012

XXII International Materials Research Congress (IMRC) 2013 August 11-16, 2013 Cancun, Mexico	CALL FOR SYMPOSIUM PROPOSALS Open now through March 1
2013 Japan Society of Applied Physics Autumn Meeting JSAP 2013 September 16-20, 2013 Kyoto, Japan	CALL FOR JOINT SYMPOSIUM PROPOSALS Open now through March 16

JUST PUBLISHED

MRS Bulletin

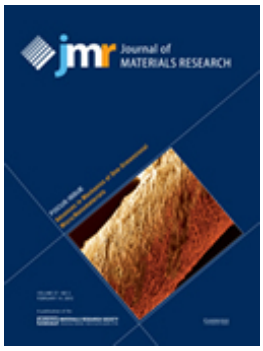
Resistive switching phenomena in thin films: Materials, devices, and applications
February 2012 Issue
Guest Editors: D.B. Strukov and H. Kohlstedt



Resistive switching, the reversible modulation of electronic conductivity in thin films under electrical stress, has been observed in a wide range of material systems and is attributed to diverse physical mechanisms. Research activity in this area has been traditionally fueled by the search for a perfect electronic memory candidate but recently received additional attention due to a number of other promising applications, such as reconfigurable and neuromorphic computing. This issue of MRS Bulletin is devoted to current state-of-the-art understanding of the physics behind resistive switching in several major classes of material systems and their intrinsic scaling prospects in the context of electronic circuit applications. In particular, the goal of this introductory article is to review the most promising applications of thin-film devices and outline some of the major requirements for their performance.

Journal of Materials Research

Advances in Mechanics of One-Dimensional Micro/Nanomaterials
February 2012, Volume 27, Issue 3 - A selection of papers



In-situ tensile testing of single-crystal molybdenum-alloy fibers with various dislocation densities in a scanning electron microscope
Kurt E. Johanns, Andreas Sedlmayr, P. Sudharshan Phani, Reiner Mönig, Oliver Kraft, Easo P. George and George M. Pharr, DOI:10.1557/jmr.2011.298

Structural transformations in nano- and microobjects triggered by disclinations
Alexey E. Romanov, Anatoly A. Vikarchuk, Anna L. Kolesnikova, Leonid M. Dorogin, Ilmar Kink and Elias C. Aifantis, DOI:10.1557/jmr.2011.372

A brittleness transition in silicon due to scale
William W. Gerberich, Douglas D. Stauffer, Aaron R. Beaber and Natalia I. Tymiak, DOI:10.1557/jmr.2011.348

MRS Communications

Rapid Communications - A selection of papers

Dominant shear bands observed in amorphous ZrCuAl nanowires under simulated compression
Qiran Xiao, H.W. Sheng and Yunfeng Shi,
DOI:10.1557/mrc.2011.26

Low-temperature aqueous solution processed fluorine-doped zinc tin oxide thin-film transistors
Jun-Hyuck Jeon, Young Hwan Hwang, JungHo Jin and Byeong-Soo Bae,
DOI:10.1557/mrc.2012.1

JUST PUBLISHED! in the MRS Symposium Proceedings Series
From the 2011 MRS Spring Meeting, San Francisco

Energy Harvesting—Recent Advances in Materials, Devices and Applications
Editors: R. Venkatasubramanian, H.B. Radousky, H. Liang, J. Poon
Volume 1325
ISBN 978-160511-302-9

Materials, Processes and Reliability for Advanced Interconnects for Micro- and Nanoelectronics—2011
Editors: M.R. Baklanov, G. Dubois, C. Dussarrat, T. Kokubo, S. Ogawa
Volume 1335
ISBN 978-160511-312-8

For a complete list of volumes in the **MRS Symposium Proceedings Series** visit www.cambridge.org/us/mrsproceedings

DIVERSIONS

Did You Know?

That pewter, which is an alloy of 85-90% tin with the remainder commonly consisting of copper, antimony and lead, was used for flatware from the Bronze Age until the 20th century?

Quiz

In what year did Charles Fritts invent the first solar cell, and what element was the primary component of his device?

Answer to the Quiz in the previous Materials360®:
In the space of a few months in 1779 the world's first iron bridge, with a single span of over 100 feet, was erected for Abraham Darby (the third of that name) over the Severn just downstream from Coalbrookdale in the U.K. Work had gone on for some time in building the foundations and casting the huge curving ribs. But in this new technology little time was spent in assembling the parts - which amounted, it was proudly announced, to 378 tons 10 cwt. of metal. The lightness of the structure intrigued all observers. An early visitor commented: 'though it seems like network wrought in iron, it will be uninjured for ages.' It is uninjured still.http://www.historyworld.net/wrldhis/PlainTextHistories.asp?gtrack=pthc&ParagraphID=ktw#ktw#ixzz1l3OXJc75

NEW PRODUCTS FOCUS

Optical Multiplexer Adds Spectra and Imaging to Your Microscope

CRAIC Technologies, a leading innovator of UV-visible-NIR microspectroscopy solutions, recently introduced Lightswitch by CRAIC ™, an optical multiplexer for the ultraviolet, visible and NIR regions. With the ability to switch between multiple paths, Lightswitch by CRAIC™ can be used to add imaging and spectroscopic capabilities to your current or future microscope and microspectrometer. These currently include low light level imaging, UV-visible-NIR spectroscopy, UV and NIR microscopy. Simple to use, yet very flexible, Lightswitch by CRAIC™ can be used with many types of microscopes as well as CRAIC microspectrophotometers. [Contact: sales@microspectra.com or 310-573-8180]

MOCVD Reactor Productivity

CRIUS® II-XL is the latest addition to AIXTRON's CCS product line, which has proven to provide ultimate process stability and robust operation throughout the years. The novel CRIUS® II-XL configuration offers an outstanding reactor capacity as high as 19x4 inch, providing high throughput and productivity. Additionally, CRIUS II-XL provides best-in-class cost of ownership and footprint efficiency. Standard features of this MOCVD system include an *in-situ* reactor height adjustment, choice of optimum reactor geometries for any process regime, and the unique ARGUS *in-situ* monitoring device.
[Contact: marcom@aixtron.com or 49-241-8909-756]

[To suggest items for inclusion in Industry News and New Products Focus, please contact Mary Kaufold at 724-779-2755]

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