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S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

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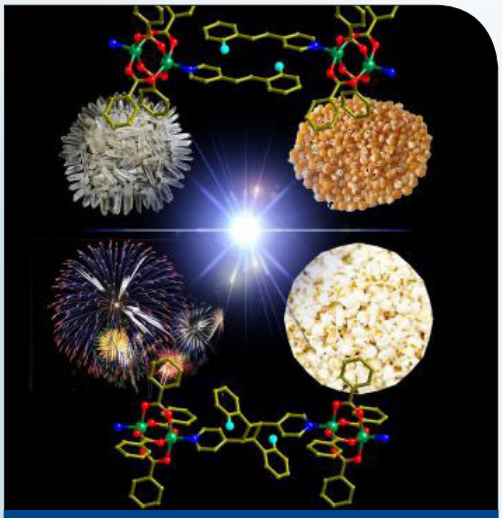
FEATURE ARTICLES

Scientists demonstrate rare chemical phenomenon to harvest solar energy

Nanowerk, 02JUN2014



Schematic diagram showing the popping nature of the crystals under UV light, a property that is very similar to the popping of corns on a hot plate. (Image: NUS)

An international team of researchers (Singapore, UAE, Germany) has unraveled the chemical reaction responsible for propelling microscopic crystals to leap distances up to hundreds of times their own size when they are exposed to UV light. This demonstrates the conversion of light into mechanical motion. TECHNICAL ARTICLE

Tags: Energy, Materials science, Solar energy, Featured Article

Rush a light wave and you'll break its data, say scientists

Science Daily, 30MAY2014

Researchers at NIST have shown how attempts to 'push' part of a light beam past the speed of light results in the loss of the quantum data the light carries. The results could clarify how noise might limit the transfer of information in quantum computers. TECHNICAL ARTICLE

Tags: Quantum science, Government S&T, Featured Article

S&T NEWS ARTICLES

ADVANCED MANUFACTURING

New printable robots could self-assemble when heated

Science Daily, 30MAY2014

Researchers at MIT demonstrate the promise of printable robotic components that, when heated, automatically fold into prescribed three-dimensional configurations.

Tags: Advanced manufacturing

ADVANCED MATERIALS

Scientists find stronger 3-D material that behaves like graphene

Nanowerk, 03JUN2014

Scientists have discovered a material that has the same extraordinary electronic properties as 2-D graphene, but in a sturdy 3-D form that should be much easier to shape into electronic devices such as very fast transistors, sensors and transparent electrodes. TECHNICAL ARTICLE

Tags: Advanced materials, Materials science

Nano world: Where towers construct themselves

Science Daily, 02JUN2014

Through computer simulations researchers in Austria showed how complex structures at the nano-scale level can spontaneously emerge and how it is possible to reliably control the ordering of the particles into specific, quasi two-dimensional aggregates. Low-dimensional systems with well-defined features have applications as antireflection coatings, biosensors, data-storage, optical and photovoltaic devices, or catalysts. TECHNICAL ARTICLE

Tags: Advanced materials

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Stronger than steel: Scientists spin ultra-strong cellulose fibers

Science Daily, 02JUN2014

The novel procedure developed by researchers in Sweden spins extremely tough filaments from tiny cellulose fibrils by aligning them all in parallel during the production process. The filaments are stronger than both aluminium and steel per weight. TECHNICAL ARTICLE

Tags: Advanced materials, S&T Sweden

Transition metal surface stabilizes graphene edge structures

Nanotechweb, 02JUN2014

An international team of researchers (Italy, USA) has shown that edges of graphene with just one carbon-carbon bond can be stably grown on transition metal surfaces, such as those made from cobalt. The result could help us better understand how to grow large areas of nearly perfect graphene on substrates for making a variety of electronics devices. TECHNICAL ARTICLE

Tags: Advanced materials

Surprising nanotubes: Some slippery, some sticky

MIT News, 01JUN2014

Researchers at MIT found that carbon nanotubes (CNTs) and boron nitride nanotubes (BNNTs) are nearly opposite in their characteristics: CNTs have an extreme form of frictionlessness, called superlubricity. BNNTs display a very high level of friction. This report is likely to remain as a benchmark against which future nanofriction theories will need to be tested. TECHNICAL ARTICLE

Tags: Advanced materials, CNT, Materials science

New method of wormlike motion lets gels wiggle through water

Science Daily, 30MAY2014

Researchers at the University of Cincinnati developed a special hydrogel that can be equipped to detect bacteria, carry cargo and deliver medicine. Using a hand-held laser they were able to induce a shrinking/swelling cycle down the length of a hydrogel to mimic peristaltic or earthworm like locomotion in water. TECHNICAL ARTICLE

Tags: Advanced materials, Sensors

Observing the random diffusion of missing atoms in graphene

Science Daily, 30MAY2014

For the first time researchers in Austria were able to watch how a defect transforms and migrates in the crystal over several minutes. A careful analysis of the path of the defect revealed that the defect performed a random walk through the crystal. The study opens a new route for the direct study of defect migration and diffusion in low-dimensional materials. TECHNICAL ARTICLE

Tags: Advanced materials, Materials science

Common semiconductors stabilized for solar fuels generation

Science Daily, 29MAY2014

Researchers at Caltech used atomic layer deposition to form a layer of "leaky TiO_2" because it leaks electricity, on single crystals of silicon, gallium arsenide, or gallium phosphide. Deposited as a film, ranging in thickness between 4 and 143 nanometers, the TiO_2 remained optically transparent on the semiconductor crystals—allowing them to absorb light—and protected them from corrosion but allowed electrons to pass through with minimal resistance. TECHNICAL ARTICLE

Tags: Advanced materials

AUTONOMOUS SYSTEMS & ROBOTICS

Video Friday: Inflatable Robots, Walk Again Project, and Nao at School

IEEE Spectrum, 30MAY2014

Hot topic in robotics these days is cloud robotics—the merger of robots and the cloud. If you're not familiar with the concept, check out this talk that UC Berkeley roboticist Ken Goldberg gave at Google as part of the company's "Academics at Google" series.

Tags: Autonomous systems & robotics

Think fast, robot: Algorithm that harnesses data from new sensor could make autonomous robots more nimble

Science Daily, 29MAY2014

Researchers at MIT propose supplementing cameras on autonomous vehicles with a neuromorphic sensor, which can take measurements a million times a second. With researchers from Switzerland they propose first state-estimation algorithm to process data from event-based sensors which allows a robot to update its location every thousandth of a second. This allows robots to perform much more nimble maneuvers.

Tags: Autonomous systems & robotics

BIG DATA

Algorithm searches for human actions in videos

Wired, 02JUN2014

Researchers at MIT and UC Irvine used natural language processing techniques in order to improve computers' ability to search for particular actions within videos. The activity-recognising algorithm is faster than previous versions and is able to make good guesses at partially completed actions, meaning it can handle streaming video.

Tags: Big data, Imaging Technology

continued...

"Science has not yet mastered prophecy. We predict too much for the next year and yet far too little for the next ten." NEIL ARMSTRONG

BIOTECHNOLOGY

Australian scientists to help create world's first synthetic complex organism

Technology Org, 03JUN2014

Researchers at New York University published the synthesis of Chromosome III of a lab strain of yeast. A team of Australian researchers from academia, government and industry are taksed to synthesise the other 15 chromosomes to generate the first fully synthetic yeast by 2017.

Tags: Biotechnology, S&T Australia

Microbes engineered for direct conversion of biomass to fuel

Science Daily, 02JUN2014

Researchers at the University of Georgia engineered a synthetic pathway into an organism, introducing genes from other anaerobic bacterium that produce ethanol, and constructed a pathway in the organism to produce ethanol directly. TECHNICAL ARTICLE

Tags: Biotechnology, Energy

A decade of breakthroughs

Harvard University, 29MAY2014

What began with a group of about two dozen principal investigators in Harvard's Schools and affiliated hospitals as a pragmatic solution to a political and funding problem now is a world leader in the exploding field of stem cell biology, with 100 principal faculty members, and more than 1,000 scientists from the undergraduate to postdoctoral level.

Tags: Biotechnology, Emerging technology, S&T Policy

Scientists developing electronic skin

PhysOrg.com, 28MAY2014

Scientists around the world are developing electronic skin in an attempt to bring a sense of touch to robots and those who wear prosthetics. If the field advances even further, it could even be used in wearable technology.

Tags: Biotechnology, Flexible electronics

ENERGY

Breakthrough in energy storage: Electrical cables that can store energy

Nanowerk, 02JUN2014

An international team of researchers (Singapore, South Korea) has developed a way to both transmit and store electricity in a single lightweight copper wire by creating a supercapacitor on the outside of the copper wire. TECHNICAL ARTICLE

Tags: Energy, Materials science

The incredible shrinking "power brick"

MIT News, 29MAY2014

While laptops continue to shrink in size and weight, the "power bricks" that charge them remain heavy and bulky. But now, MIT spinout FINsix has invented an adapter that's roughly one-quarter the size and one-sixth the weight of a conventional brick, and just as efficient.

Tags: Energy, Battery

Structural supercapacitors take a load on

Physics World, 28MAY2014

Researchers at Vanderbilt University have developed a solid-state supercapacitor that works under great stresses and vibrations. Unlike traditional supercapacitors, the new design does not delaminate under stress and could lead to a variety of practical applications, from more-efficient devices to renewable-energy storage. TECHNICAL ARTICLE

Tags: Energy, Materials science

FORECASTING

Emerging and Readily Available Technologies and National Security: A Framework for Addressing Ethical, Legal, and Societal Issues.

National Academy of Sciences, 03JUN2014

The committee explored three areas with respect to ERA technologies: The conduct of research, Research applications and Unanticipated, unforeseen, or inadvertent ELSI consequences. REPORT

Tags: Forecasting

INFORMATION TECHNOLOGY

Multidimensional image processing and analysis in R

PhysOrg.com, 02JUN2014

Researchers at Lawrence Berkeley National Laboratory believe that an esoteric, open-source programming language for statistical analysis—called R—could pave the way for open science. Today, thousands of international scientists are participating in the R development community. More information about R

Tags: Information Technolog

CSAIL convenes leading thinkers to discuss future of computing

MIT News, 29MAY2014

On May 28 and 29, MIT's Computer Science and Artificial Intelligence Laboratory (CSAIL) commemorated 50 years of computer science research with MAC50: The Future of Computing," a two-day conference featuring talks by

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leading thinkers in the field, including the founders of iRobot, Ethernet, and Google's Boston Dynamics.
Tags: Information Technology

Microsoft claims breakthrough in real-time translation

PhysOrg.com, 28MAY2014

Researchers at Microsoft have addressed significant system and user-interface design challenges, including reducing latency and developing visual feedback so the translation system is continuously improving itself using user feedback. At a conference, the team demonstrated near-simultaneous translation between English and German.
Tags: Information Technology

Featured Resource

Kurzweil AI

The leading visionaries represented on this site cover trends that are profoundly impacting science, economics, the arts, politics, government, warfare, medicine, health, education, disabilities, behavior, and society. RSS feeds

MATERIALS SCIENCE

Electrical response of metals to extreme pressures predicted

Science Daily, 02JUN2014

Researchers at Rensselaer Polytechnic Institute show that it is possible to predict how subjecting metals to severe pressure can lower their electrical resistance, a finding that could have applications in computer chips and other materials that could benefit from specific electrical resistance. TECHNICAL ARTICLE
Tags: Materials science

MICROELECTRONICS

105-bit optical memory built on a chip

Physics World, 29MAY2014

Researchers in Japan have fabricated two fully functional optical memories on single chips. The devices use bistable optical cavities to store the bits, and allow multiple bits to be controlled simultaneously by the same waveguide. The researchers hope that such a memory device could be used for optical logic operations to increase the speed of computation. TECHNICAL ARTICLE
Tags: Microelectronics, Information technology, S&T Japan

Engineers develop new device to cool chips at the micro scale

PhysOrg.com, 28MAY2014

Researchers at UC Berkeley and UC San Diego have built a novel evaporator structure that can cool chips with micro scale features. The structures are built on silicon chips for direct incorporation into electronics.
Tags: Microelectronics

NEUROSCIENCE

How to erase a memory—and restore it: Researchers reactivate memories in rats

Science Daily, 01JUN2014

Researchers at UC San Diego have erased and reactivated memories in rats, profoundly altering the animals' reaction to past events. The study is the first to show the ability to selectively remove a memory and predictably reactivate it by stimulating nerves in the brain at frequencies that are known to weaken and strengthen the connections between synapses. TECHNICAL ARTICLE
Tags: Neuroscience

Journey of Discovery Starts toward Understanding and Treating Networks of the Brain

DARPA News, 27MAY2014

UCSF and MGH will oversee teams of physicians, engineers, and neuroscientists who are working together to develop advanced brain interfaces, computational models of neural activity, and clinical therapies for treating networks of the brain. The teams will collaborate with academia, industry, and government to apply a broad range of perspectives to the technological challenges involved.
Tags: Neuroscience, Government S&T

PHOTONICS

Levitation just part of the power of pushy light

PhysOrg.com, 02JUN2014

Every time light is absorbed or reflected, it exerts a force. Using ground-based telescopes, lasers will be aimed at a problematic piece of debris. The velocity of the debris will only be changed minutely, but a small change in direction can be enough to shift the orbit and prevent a collision with a valuable satellite.
Tags: Photonics

Spraying light—the fabrication of light-emitting 3D objects

Nanowerk, 02JUN2014

Introducing a new, purpose-designed spray-sintering deposition technique, researchers in Sweden report that it is possible to spray liquid inks onto essentially any surface for the achievement of light emission. TECHNICAL ARTICLE
Tags: Photonics, S&T Sweden

Novel laser system mimics sunlight to test solar cell efficiency

Science Daily, 30MAY2014

Researchers at NIST have developed a novel system that simulates sunlight well across a broad spectrum of visible to infrared light. More flexible than conventional solar simulators, the laser instrument can be focused down to a small beam spot—with resolution approaching the theoretical limit—and shaped to match any desired spectral profile. TECHNICAL ARTICLE

Tags: Photonics, Government S&T

SCIENCE WITHOUT BORDERS

Physicists take quantum leap toward ultra-precise measurement

Science Daily, 02JUN2014

Researchers in Canada have developed a way to employ multiple detectors in order to measure photons in entangled states. The experimental apparatus uses a fiber ribbon to collect photons and send them to an array of 11 detectors. Their work paves the way for great advances in using quantum states to develop ultra-precise measurement technologies. TECHNICAL ARTICLE

Tags: Science without borders, S&T Canada

A matter of matter: Demonstrating destructive quantum interference using Bose-Einstein condensates

PhysOrg.com, 28MAY2014

Researchers in Australia write that a matter-wave demonstration of the HOM effect would enable an expansion of foundational tests of quantum mechanics into previously unexplored regimes, and discuss the possibility of implementing an experiment based on their simulation that could demonstrate a Bell inequality violation using an atom-optics adaptation of the Rarity–Tapster setup. TECHNICAL ARTICLE

Tags: Science without borders, S&T Australia ■

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