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FEATURE ARTICLES

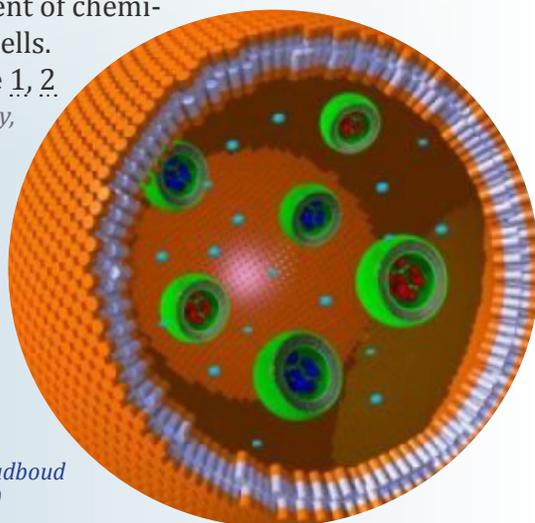
[First Plastic Cell With Working Organelle](#)

[Science Daily, 14JAN2014](#)

Researchers in the Netherlands have successfully produced an artificial cell containing organelles capable of carrying out the various steps of a chemical reaction. They are also working on ways of controlling the movement of chemicals within the cells.

Technical article [1](#), [2](#)

Tags: [Biotechnology](#), [Biology](#), [Featured Article](#)



A close-up of a polymer cell with organelles. (Credit: Image courtesy of Radboud University Nijmegen)

[Engineers create light-activated 'curtains' with carbon nanotubes \(w/video\)](#)

[Nanowerk, 10JAN2014](#)

Researchers at the University of California, Berkeley, layered carbon nanotubes onto a plastic polycarbonate membrane to create a material that moves quickly in response to light. Within fractions of a second, the nanotubes absorb light, convert it into heat and transfer the heat to the polycarbonate membrane's surface. The plastic expands in response to the heat, while the nanotube layer does not, causing the two-layered material to bend.

TECHNICAL ARTICLE

Tags: [Advanced materials](#), [Featured Article](#)

S&T NEWS ARTICLES

ADVANCED MATERIALS

[Supercomputer simulates 3,000-atom nano device](#)

[Nanowerk, 14JAN2014](#)

Researchers in Japan developed a computational technique that reduces memory requirements while preserving accuracy. The technique makes it possible to derive the electrical properties of a 3,000-atom nano device using the first-principles method. The research is a significant step toward the design of new nano devices.

Tags: [Advanced materials](#), [S&T Japan](#)

[Wonder material silicene has suicidal tendencies \(w/video\)](#)

[Nanowerk, 14JAN2014](#)

The semiconductor industry of the future had high expectations of the new material silicene, which shares a lot of similarities with graphene. However, researchers in the Netherlands found that the moment that a certain amount of silicon atoms fall on top of the formed silicene layer, a silicon crystal is formed, which triggers the further crystallization of the material; an irreversible process. From that moment, the newly formed silicon "eats" the silicene.

TECHNICAL ARTICLE

Tags: [Advanced materials](#)

[Scientists cook up new single-layer electronic material](#)

[Nanowerk, 10JAN2014](#)

Scientists from SLAC, Stanford and Berkeley National Laboratory grew sheets of an exotic material in a single atomic layer and measured its electronic structure for the first time. They discovered it's a natural fit for making thin, flexible light-based electronics. TECHNICAL ARTICLE

Tags: [Advanced materials](#)

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Shape memory polymers and their composites in aerospace applications: a review

Institute of Physics, 10JAN2014

As a new class of smart materials, shape memory polymers and their composites (SMPs and SMPCs) can respond to specific external stimulus and remember the original shape. In this review, the general mechanism of SMPs and SMPCs are first introduced, the stimulus methods are then discussed to demonstrate the shape recovery effect, and finally, the applications of SMPs and SMPCs that are reinforced with fiber materials in aerospace are reviewed.

Tags: Advanced materials

Researchers Invent ‘Sideways’ Approach to 2-D Hybrid Materials

Science Daily, 09JAN2014

Researchers at DOE’s Oak Ridge National Laboratory and the University of Tennessee combined two compounds—graphene and boron nitride—into a single layer only one atom thick. The graphene piece acted as a seed for the epitaxial growth in two-dimensional space, so that the crystallography of the boron nitride is solely determined by the graphene. [TECHNICAL ARTICLE](#)

Tags: Advanced materials, Government S&T

Theory for Metamaterials That Act as an Analog Computer

Science Daily, 09JAN2014

A study by an international team of researchers (USA, Italy) showed that metamaterials can be designed to do “photonic calculus” as a light wave goes through them. [TECHNICAL ARTICLE](#)

Tags: Advanced materials, Materials science

AUTONOMOUS SYSTEMS & ROBOTICS

Robots test their own world wide web, dubbed RoboEarth

BBC News, 14JAN2014

RoboEarth has been developed by research scientists from Philips and five European universities. At its core RoboEarth is a world wide web for robots: a giant network and database repository where robots can share information and learn from each other. The aim of the system is to create a kind of ever-changing common brain for robots.

Tags: Autonomous systems & robotics

BIG DATA

How the Friendship Paradox Makes Your Friends Better Than You Are

MIT Technology Review, 14JAN2014

A team of researchers (France, Finland) have evaluated the properties of different characteristics on networks and worked out the mathematical conditions that determine whether the paradox applies to them or not. They say that

when a paradox arises as a result of the way nodes are connected together, any other properties of these nodes demonstrate the same paradoxical nature, as long as they are correlated in certain ways.

Tags: Big data

DATA TO DECISION

Researchers develop ‘personalized advantage index,’ a new decision-making tool

PhysOrg.com, 08JAN2014

Researchers at the University of Pennsylvania and the University of Pittsburgh have developed a decision-making model, called the “predictive advantage index” that compares and weights multiple variables in order to predict the optimal choice. The tool could be used not just in personalized medicine but in any decision-making scenario with complex, and potentially conflicting, variables. [TECHNICAL ARTICLE](#)

Tags: Data To Decision

ENERGY

Researchers Harness Sun’s Energy During Day for Use at Night

Science Daily, 14JAN2014

Researchers at the University of North Carolina at Chapel Hill have built a new system known as a dye-sensitized photoelectrosynthesis cell, or DSPEC. It generates hydrogen fuel by using the sun’s energy to split water into its component parts. After the split, hydrogen is sequestered and stored, while the byproduct, oxygen, is released into the air.

Tags: Energy, Solar energy

Using micro-windmills to recharge cell phones

Nanowerk, 10JAN2014

Researchers at the University of Texas, Arlington, have designed a micro-windmill that generates wind energy and may become an innovative solution to cell phone batteries constantly in need of recharging and home energy generation where large windmills are not preferred.

Tags: Energy

Disordered materials hold promise for better batteries

PhysOrg.com, 09JAN2014

Researchers at MIT and DOE’s Brookhaven National Laboratory found that a significant excess of lithium in the material changes things dramatically. In the traditional ordered structure, there is an exact balance between the number of lithium and metal atoms. But if you get enough of a lithium excess, you get new channels, and they can take over from the channels you close off. [TECHNICAL ARTICLE](#)

Tags: Energy, Battery, Government S&T

“The most incomprehensible thing about our universe is that it can be comprehended.”

ALBERT EINSTEIN

FORECASTING

[New Patent Mapping System Helps Find Innovation Pathways](#)

Science Daily, 14JAN2014

A team of researchers (USA, Spain and a data-mining company) have developed a new patent mapping system that considers how patents cite one another. This may help researchers better understand the relationships between technologies—and how they may come together to spur disruptive new areas of innovation.

Tags: Forecasting

[Crowdsourcing forecasts on science and technology events and innovations](#)

KurzweilAI, 10JAN2014

“SciCast”, a federally funded research project, launched by George Mason University aims to improve the accuracy of science and technology forecasts. The continually updated and reshaped information helps both the public and private sectors better monitor developments in a variety of industries. SciCast is a real-time indicator of what participants think is going to happen in the future.

Tags: Forecasting

[Postmortem on Last Year’s Predictions](#)

IEEE Spectrum, 09JAN2014

IEEE Spectrum told you what to expect in 2013, and now we are ‘fessing up to our misses, as well as bragging about our hits.

Tags: Forecasting

IMAGING TECHNOLOGY

[Seamless panoramic video surveillance in any environment](#)

EU R&D News, 08JAN2014

The “CHAMELEON” video surveillance system, funded by the EU, automatically combines images from multiple cameras with overlapping regions to create a natural seamless 180° panoramic view of the monitored area. The innovation has huge potential in a number of applications such as remote monitoring, border control, temporary exhibitions and events and transport.

Tags: Imaging technology

MATERIALS SCIENCE

[Molecular ‘centrifuge’ creates ultraslow beams](#)

Physics World, 10JAN2014

Physicists in Germany have developed a technique for producing the first ever near-continuous beams of molecules slowed and cooled to a temperature of just one

degree above absolute zero. The method could help provide new insights into quantum states of matter and even allow physicists to work out if the electron has an electric dipole moment. The beams could also prove useful in studying chemical reactions that occur when molecules collide.

TECHNICAL ARTICLE

Tags: Materials science, Particle physics, S&T Germany

[‘Superlens’ Extends Range of Wireless Power Transfer](#)

Science Daily, 10JAN2014

Duke University researchers have demonstrated the feasibility of wireless power transfer using low-frequency magnetic fields over distances much larger than the size of the transmitter and receiver. TECHNICAL ARTICLE

Tags: Materials science, Energy

MEDICAL SCIENCES

[Discovery May Aid Vaccine Design for Common Form of Malaria](#)

Newswise, 09JAN2014

Researchers at Washington University in St. Louis have revealed that a form of malaria common in India, Southeast Asia and South America attacks human red blood cells by clamping down on the cells with a pair of proteins. The study provides details that will help scientists design better vaccines and drug treatments for the strain, Plasmodium vivax.

Tags: Medical Sciences, Biology, Biotechnology

[Prediction of Future Flu Virus](#)

Science Daily, 09JAN2014

The differences in the seasonal flu usually result from point mutations in the influenza virus genes, while major pandemics are often connected to profound genetic shifts known as reassortments. For the first time, the link between these two phenomena was studied by Russian researchers.

Tags: Medical Sciences, S&T Russia

MICROELECTRONICS

[Ultra-Low Consumption Chip Developed](#)

Science Daily, 10JAN2014

Researchers in Spain have developed a chip incorporating a new design of ultra-low consumption, digital analogue converter. It consumes 50 million times less energy than a conventional light bulb. This low consumption means that the device can be powered using the reduced energy captured from the environment (light, vibrations, temperature variations, etc.).

Tags: Microelectronics

continued...

[Ultra-Thin Flexible Transparent Electronics Can Wrap Around a Hair](#)

Science Daily, 09JAN2014

Researchers in Switzerland developed and demonstrated the special characteristics of an electronic component in the form of an ultra-thin membrane. The new thin-film transistors adhere to a wide range of surfaces and adapt perfectly. The aim is to weave these types of components into textiles or apply them to the skin in order to make objects 'smart', or develop unobtrusive, comfortable sensors that can monitor various functions of the body.

[TECHNICAL ARTICLE](#)

Tags: Microelectronics, S&T Switzerland

FEATURED RESOURCE

[Inside Science](#)

Inside Science provides editorially independent research news and information on science, engineering, mathematics, and related fields for general audiences through television, print and the web. [RSS](#)

NEUROSCIENCE

[Younger People Have 'High Definition' Memories](#)

Science Daily, 14JAN2014

Researchers at Vanderbilt University found that while behavioral measures indicated a lower capacity in older adults than younger adults to memorize items, the neural measure of memory capacity was very similar in both groups. In other words, during the maintenance stage, both groups stored the same number of items. The researchers suggest, however, that older adults store the items at a lower resolution than younger adults, resulting in impaired recollection. [TECHNICAL ARTICLE](#)

Tags: Neuroscience

[Ultrasound directed to the human brain can boost sensory performance](#)

EurekAlert, 12JAN2014

Researchers at Virginia Tech have demonstrated that ultrasound has a greater spatial resolution than two other leading noninvasive brain stimulation technologies. They believe focused ultrasound changed the balance of ongoing excitation and inhibition processing sensory stimuli in the brain region targeted. They also believe this shift prevented the spatial spread of excitation in response to stimuli resulting in a functional improvement in perception. [TECHNICAL ARTICLE](#)

Tags: Neuroscience

PHOTONICS

[Towards perfect control of light waves](#)

Nanowerk, 13JAN2014

Researchers in Germany have constructed a detector which provides a detailed picture of the waveforms of femto-second laser pulses. Knowledge of the exact waveform of the pulses enables scientists to reproducibly generate light flashes that are a thousand times shorter—lasting only for attoseconds—and can be used to study ultrafast processes at molecular and atomic levels. [TECHNICAL ARTICLE](#)

Tags: Photonics, S&T Germany

[Controlling light with light](#)

PhysOrg.com, 10JAN2014

An international team of researchers (Russia, Britain) proposes light-light interaction without the need for optical nonlinearity. They demonstrated the use of this effect for generation of waveguided pulse trains with clock frequencies determined by the intensity of the continuous control light. The method is based on a nano-opto-mechanical system integrated in a plasmonic waveguide.

[TECHNICAL ARTICLE](#)

Tags: Photonics, S&T Russia, S&T UK

QUANTUM SCIENCE

[Quantum-to-classical transition may be explained by fuzziness of measurement references](#)

PhysOrg.com, 14JAN2014

Researchers in South Korea explain that a complete measurement process is composed of two parts: one part is to set and control a measurement reference (such as timing or angle), and the other is the final detection. Their main result is that coarsening the measurement reference always forces the quantum-to-classical transition, while coarsening the final detection does not. [TECHNICAL ARTICLE](#)

Tags: Quantum science

[Quantum Mechanics Explains Efficiency of Photosynthesis](#)

Science Daily, 09JAN2014

According to researchers in England the properties of some of the chromophore vibrations that assist energy transfer during photosynthesis can never be described with classical laws, and moreover, this non-classical behaviour enhances the efficiency of the energy transfer.

[TECHNICAL ARTICLE](#)

Tags: Quantum science, S&T UK

S&T POLICY

China is researching diamond quantum chips with qubits tempered by over 45 tesla magnets to achieve a code breaking quantum supercomputer

Next Big Future, 10JAN2014

At leading universities, state research institutes and the military, researchers working on projects from the generation of the strongest ever man-made magnetic field to building a “quantum chip” from diamonds, have been told by officials to get the job done regardless of how much it costs. The Steady High Magnetic Field Experimental Facility, housed in a three-story complex on the Hefei Science Island, could be activated this year to create the extreme environment needed to make quantum computing possible.

Tags: *S&T policy, S&T China***Researchers propose alternative way to allocate science funding**

EurekAlert, 08JAN2014

Researchers in the United States have suggested an alternative way to allocate science funding. The method, which is described in “EMBO reports”, depends on a collective distribution of funding by the scientific community, requires only a fraction of the costs associated with the traditional peer review of grant proposals and, according to the authors, may yield comparable or even better results. TECHNICAL ARTICLE

Tags: *S&T policy*

SENSORS

Even 25 Metres Below Ground, Positioning System Tracks Firefighters

Science Daily, 14JAN2014

An innovative digital positioning system developed by researchers in Switzerland that uses sensors inside the heel of a boot makes it possible for emergency commanders to follow firefighters’ movements independently of infrastructure, and even 25 metres below ground.

Tags: *Sensors, S&T Switzerland***New Method for Localization and Human Being Detection using UWB Technology: Helpful Solution for Rescue Robots**

arXiv.org, 11JAN2014

Researchers in France propose a new method to both detect human beings and locate the rescue robot at the same time. To achieve these goals they optimize the design of UWB pulses based on B-splines. The spectral effectiveness is optimized so the symbols are easier to detect and noise is reduced. The positioning system locates the rescue robot with an accuracy about 2 centimeters.

Tags: *Sensors, S&T France***Smart shirt knows when you’re not up to snuff**

PhysOrg.com, 11JAN2014

A France based company has developed “Smart Sensing” material that reads body heat, heart rate, motion and location. Sensors in the shirt made of smart material capture data about a wearer and transmit the information through a small battery-powered unit sewn discretely where a label typically goes. The data is sent in real-time wirelessly to a smartphone, where an application charts it in a timeline and alerts people to potential physical problems.

Tags: *Sensors, Flexible electronics, S&T France***Extraordinary nanosensors pushed to their boundaries**

Nanowerk, 09JAN2014

Researchers in Switzerland have recently managed to isolate and eliminate external “noises” that deteriorate the performance of a new-generation of sensors capable of detecting very small forces with unprecedented efficiency. Their discovery paves the way to the development of some of the best sensors in the world. TECHNICAL ARTICLE

Tags: *Sensors, S&T Switzerland***ABOUT THIS PUBLICATION**

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