Matériaux

Bulletin de Veille - 25 octobre 2018

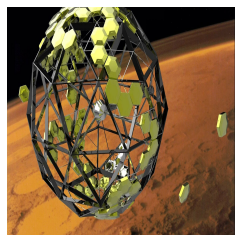
Retrouvez tous les bulletins de Veille dans l'espace Galaxi du pôle Veille

SOMMAIRE

A LA UNE

Plans for a modular Martian base that would provide its own radiation shielding

17/10/2018 - phys.org

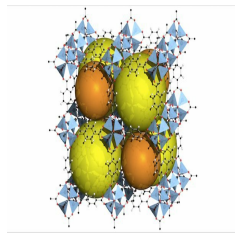


The idea of exploring and colonizing Mars has never been more alive than it is today. This base would be transported to Mars aboard a vessel with sphere-shaped core (measuring about 300 meters (984 ft) in diameter) around which the hexagonal base modules would be arranged. Each module would be equipped with four motorized legs that would allow them to move around on the surface and connect with the other habitation modules once they arrive.

GÉNÉRALITÉS - MATÉRIAUX

You've Probably Never Heard of MOFs, but...

18/10/2018 - blogs.scientificamerican.com



But in 1939, after its debut at the New York World's Fair, one type of plastic—nylon—became a household word in less than a year. With simple changes to the monomers, polymers can become smaller or larger, softer or harder, stiff or stretchy, opaque or transparent, even electrically conductive. Nylon was the first widely known, commercially available synthetic polymer. But just as Teflon could not have been predicted 100 years ago, we can't predict the full scope of possibilities for MOFs.

Saint-Gobain to Exhibit at World's Largest Aluminium Trade Fair in Germany

11/10/2018 - www.azom.com

Saint-Gobain Ceramic Materials, a leading provider of advanced material solutions, is exhibiting at the upcoming Aluminium Trade Fair in Düsseldorf, Germany, October 9 – 11, 2018. Saint-Gobain's Boron Nitride products include CarboTherm™ thermal management fillers; Combat® solid components, coatings and industrial powders; IDEALUBE® industrial lubricants; PDS® Products N-Type and P-Type planar diffusion sources; and TRÈS BN cosmetic powders. .

Inspect Wafers Straight from the FOUP with the New Nordson DAGE Quadra® W8 Automated Wafer X-Ray Inspection System

09/10/2018 - www.azom.com

Nordson DAGE, a division of Nordson Corporation (NASDAQ: NDSN), announces the launch of Quadra® W8, a versatile lab-based solution for wafer-level inspection offering industry-leading magnification and image quality. About Nordson Corporation Nordson Corporation engineers, manufactures and markets differentiated products and systems used to dispense, apply and control adhesives, coatings, polymers, sealants, biomaterials, and other fluids, to test and inspect for quality, and to treat

REVÊTEMENTS

- Universal Photonics to Distribute 3M Polishing Tool
- An Alternative to Air Conditioning: A Paint-On Polymer That Cools Down Your Building
- Researchers quickly harvest 2-D materials, bringing them closer to commercialization
- New Mars rover gets high-tech paint job for harsh conditions on Mars

SEMI-CONDUCTEURS

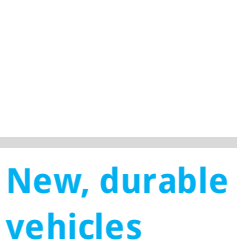
- New Faster, Scalable Method for Developing Molecular Semiconductors
- Electrical enhancement: Engineers speed up electrons in semiconductors
- Precise electron spin control yields faster memory storage

and cure surfaces.

MATÉRIAUX POUR L'ÉNERGIE

New method developed to 3D print lithium-ion batteries in nearly any shape

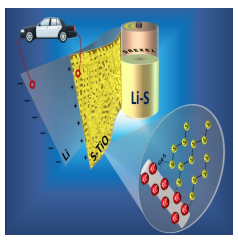
18/10/2018 - www.3ders.org



However, the problem that has stood in the way of fully 3D printed lithium-ion batteries is that the the polymers used for 3D printing, such as poly(lactic acid) (PLA), are not ionic conductors. Future work may include developing ways to increase the capacity of 3D printed battery, such as "replacing the polymer-based anode and cathode materials with 3D printable pastes that can accommodate high loadings of active material and can be printed in tandem with a polymer separator and case.

Lithium-sulfur Batteries as The Energy Storage Devices of the Future

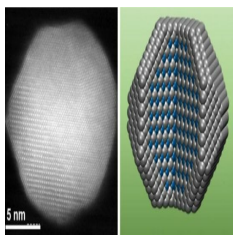
17/10/2018 - www.azom.com



But a new method, publicized by scientists in Drexel's College of Engineering in a recent edition of the American Chemical Society journal Applied Materials and Interfaces, shows that it can keep polysulfides in place, preserving the battery's remarkable endurance, while decreasing the overall weight and the time taken to make them. This cathode design can not only enable the Li-S battery to preserve its energy density, but also to achieve it without the need for extra materials that increase weight and cost of production, according to Kalra.

New, durable catalyst for key fuel cell reaction may prove useful in eco-friendly vehicles

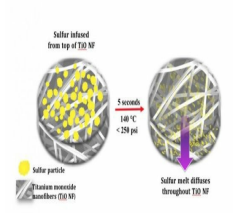
16/10/2018 - www.sciencedaily.com



The catalyst, made from alloying platinum with cobalt in nanoparticles, was shown to beat U.S. The particles have a pure platinum outer shell surrounding a core made from alternating layers of platinum and cobalt atoms. "That increases the reactivity of the platinum and at the same time protects the cobalt atoms from being eaten away during a reaction. The testing showed that the catalyst beats targets set by the Department of Energy (DOE) for both initial activity and longer-term durability.

A stabilizing influence enables lithium-sulfur battery evolution

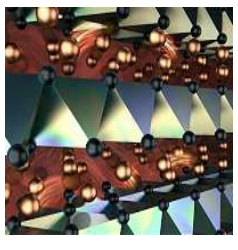
16/10/2018 - www.sciencedaily.com



This cathode design can not only help Li-S battery maintain its energy density, but also do it without additional materials that increase weight and cost of production, according to Kalra. This means their cathode design can help a Li-S battery maintain its energy density -- and do it without additional materials that increase weight and cost of production, according to Kalra. ...

Copper ions flow like liquid through crystalline structures

10/10/2018 - www.spacedaily.com

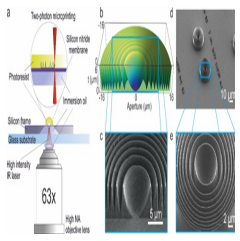


Materials scientists have sussed out the physical phenomenon underlying the promising electrical properties of a class of materials called superionic crystals. In a new study, scientists from Duke University, Oak Ridge National Laboratory (ORNL) and Argonne National Laboratory (ANL) probed one such superionic crystal containing copper, chromium and selenium (CuCrSe2) with neutrons and X-rays to determine how the material's copper ions achieve their liquid-like properties.

MATÉRIAUX POUR L'OPTIQUE

Scientists invent high-efficient, 3D nanoprinted polymer lenses for X-ray microscopes

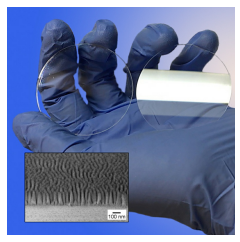
15/10/2018 - www.3ders.org



The Modern Magnetic Systems and Physical Intelligence departments at the Max Planck Institute for Intelligent Systems in Stuttgart have teamed up to find a new and less-expensive method for making 3D Kinoforms, converging lenses that are able to efficiently focus X-rays. “With the new invention, the 3D printing of a lens takes less than a minute and therefore, the costs of prototyping and manufacturing of X-ray lenses are strongly reduced. Application of 3D nanoprinting for new and advanced concepts and new type of X-ray optics. ..

'Invisible Glass’ Takes First Prize in ‘Create the Future’ Contest

09/10/2018 - www.techbriefs.com

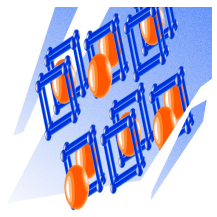


Creators of an "Invisible Glass" were awarded top honors in this year’s "Create the Future" Design Contest. When the fabrication technique is applied to both sides of a glass window, more than 99.7% of incident visible light is transmitted — making the glass essentially invisible. A conventional piece of glass shows glare (right) while the nano textured glass (left) shows no glare.

MÉTAUX

New Properties of Uranium Compounds Discovered

16/10/2018 - www.azom.com



Superconductivity can be defined as the total disappearance of electrical resistance in a material when it is cooled down to a particular temperature, causing the magnetic field to be forced out from the material. Our study showed that metal hydrides hold as much potential as non-metals in terms of high-temperature superconductivity,” says the chief author of the study Ivan Kruglov, a researcher in Computational Materials Discovery Laboratory at MIPT. .

NANOMATÉRIAUX

FEFU Team Awarded Russian Material Grant

18/10/2018 - www.photonics.com

During the three-year RFBR grant period, the scientists will synthesize the basic nanopowders, establish sintering parameters of the laser-ceramic layer with a thermoelectric component, elaborate the method for their combination into unified material, standardize material functionality, and put it into practice. .

Catalytic active sites determined using carbon nanotubes

10/10/2018 - www.sciencedaily.com

Although the beneficial results of the new materials are evident, identifying the cause of the activity of the catalyst can be challenging. They then tested the catalytic activity of these materials and contrasted it with the activity of the same materials when the metal and the support were in direct physical contact. "Using this straightforward and simple method, we can better understand how these complex materials work, and use this information to make better catalysts," Crossley said

POLYMÈRES - ÉLASTOMÈRES

Ultra-Light Gloves Allow Users to Touch, Grasp and Work on Virtual Objects

16/10/2018 - www.azom.com

DextrES is composed of nylon with thin elastic metal strips running over the fingers. We have many different kinds of receptors at a very high density in the joints of our fingers and embedded in the skin.

REVÊTEMENTS

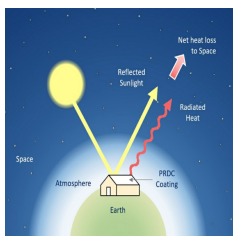
Universal Photonics to Distribute 3M Polishing Tool

18/10/2018 - www.photonics.com

Surface preparation material manufacturer Universal Photonics Inc. has been given exclusive North American distribution rights for 3M's Trizact Diamond Tile. The Trizact Diamond Tile polishing tool removes material faster than coarse slurries or fixed pellets and with less subsurface damage, but does so without the messy residue of slurry lapping. A key advantage of the material is that low pressures can be used. Universal Photonics is a provider of critical surface preparation materials.

An Alternative to Air Conditioning: A Paint-On Polymer That Cools Down Your Building

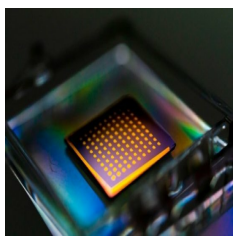
17/10/2018 - www.techbriefs.com



"This simple but fundamental modification yields exceptional reflectance and emittance that equal or surpass those of state-of-the-art PDRC designs, but with a convenience that is almost paint-like," said lead researcher Jyotirmoy Mandal. Mandal: The process we employ to make our coating – a simple, solution-based process called phase inversion – makes the polymer porous, with micro- and nano-sizes air voids.

Researchers quickly harvest 2-D materials, bringing them closer to commercialization

12/10/2018 - www.sciencedaily.com



The existing process, in which individual flakes are split off from the bulk crystals by repeatedly stamping the crystals onto an adhesive tape, is unreliable and time-consuming, requiring many hours to harvest enough material and form a device. "We use very simple mechanics, and by using this controlled crack propagation concept we are able to isolate monolayer 2-D material at the wafer scale," he says.

New Mars rover gets high-tech paint job for harsh conditions on Mars

11/10/2018 - arstechnica.com

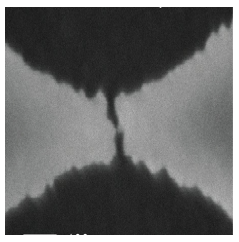
But by day, he works in the paint shop of NASA's Jet Propulsion Laboratory, applying paint to components for Pathfinder, Juno, Cassini, and Deep Impact, among other NASA missions. They also applied over 130 temporary sheet metal stencils to protect larger sections of the chassis, and then carefully sanded down the surface. The finished product is now in the Spacecraft Assembly Facility, parked next to the cruise and descent stages of the rover. The Mars 2020 mission should launch in July 2020 from Cape Canaveral, reaching Mars in February 2021.

SEMI-CONDUCTEURS

New Faster, Scalable Method for Developing Molecular Semiconductors

17/10/2018 - www.azom.com

Molecular electronics can contribute to this, and researchers in this field have been working on the development of scalable nanoscale electrodes that can be used to explore and manipulate molecular behavior to benefit electronic materials. The scientists claimed that with a 100 mm



diameter wafer of thin materials, they could create as many as 20 million such electrodes within five hours, using a gold film on top of a brittle material that forms cracks...

Electrical enhancement: Engineers speed up electrons in semiconductors

17/10/2018 - www.sciencedaily.com

Led by Kenji Ogino, a professor at Graduate School of Bio-Applications and Systems Engineering at TUAT, Japan, the team found that adding polystyrene, commonly known as Styrofoam in North America, could enhance the semiconducting polymer by allowing electrons to move from plane to plane quickly. "We found that hole mobility extraordinarily improved by the introduction of polystyrene block accompanied by the increase of the ratio of rigid amorphous domain. The addition of polystyrene introduced more amorphous domain, but contained by flexible chains of carbon and hydrogen atoms.

Precise electron spin control yields faster memory storage

09/10/2018 - www.sciencedaily.com

In a recent study published in EPJ B, John Kay Dewhurst and colleagues, have developed a new theory to predict the complex dynamics of spin procession in materials subjected to ultra-short laser pulses. In this study, the authors study the effect of firing an ultra-short laser pulse -- below 100 femtoseconds -- on the internal electron spin rotation in bulk cobalt, nickel and combinations of these metals with platinum. When such magnetic anisotropy energy is large, the spin rotation effect is too small to cause any significant precession of spins below 100 femtoseconds.