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GÉNÉRALITÉS - MATÉRIAUX

Germ-fighting catheter coating may help prevent infections

07/03/2019 - www.sciencedaily.com

Brown University researchers have developed a new antibacterial coating for intravascular catheters that could one day help to prevent catheter-related bloodstream infections, the most common type of hospital-acquired infection. Other coatings also tend to use traditional antibiotics, raising concerns about antibiotic resistance over long term use.

New graphene-based device is first step toward ultrasensitive biosensors

07/03/2019 - www.sciencedaily.com

We hope that our device using graphene and a unique manufacturing process will provide the fundamental research that can help overcome those challenges. Graphene, a material made of a single layer of carbon atoms, was discovered more than a decade ago. Significant attempts have been made to improve biosensors using graphene, but the challenge exists with its remarkable single atom thickness.

Physicists solve 35-year-old mystery about quarks

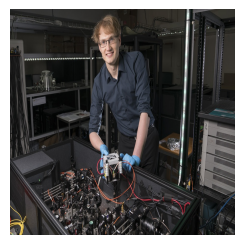
04/03/2019 - www.sciencedaily.com

The researchers discovered that the speed of a quark depends on the number of protons and neutrons forming short-ranged correlated pairs in an atom's nucleus. The more such pairs there are in a nucleus, the larger the number of slow-moving quarks within the atom's protons and neutrons. The experiment amassed billions of interactions between electrons and quarks, allowing the researchers to calculate the speed of the quark in each interaction based on the electron's energy after it scattered, and to compare the average quark speed among the various atoms.

AÉROSPATIAL

The sky is not the limit for 2D material space technology

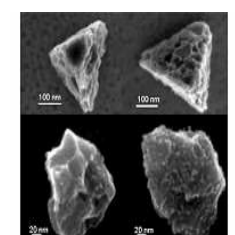
13/03/2019 - physicsworld.com



Reporting in [Nature Communications](#) Tobias Vogl and Ping Koy Lam at the Australian National University's Centre for Quantum Computation and Communication Technology, alongside colleagues at the University, present the results of in-depth investigations of the effects of the radiation in earth's atmosphere on various 2D material devices.

Silicon carbide 'stardust' in meteorites leads to understanding of erupting stars

07/03/2019 - www.spacedaily.com



The microscopic grains of silicon carbide - a thousand times smaller than the average width of a human hair - were part of the construction materials that built the sun and planetary system. Today these bits of stardust, or presolar grains, can be identified in primitive solar system materials such as chondritic meteorites. It turned out that getting the

parts

NANOMATÉRIAUX

- Ice cores reveal huge solar storm struck Earth around 660 BC
- The moiré patterns of three layers change the electronic properties of graphene

POLYMÈRES - ÉLASTOMÈRES

- Braskem Launches New Grade of Polypropylene Resin to Increase Big Bag Production
- Scientists develop 3D printed plastic-composite sensor capable of detecting changes in water

SEMI-CONDUCTEURS

- Mele, Kane Win Frontiers of Knowledge Award for Discovering Topological Insulators
- When semiconductors stick together, materials go quantum

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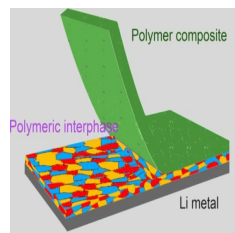
- SFS Intec Partners with TXV to Re-engineer Aircraft Bracket Using High Performance Thermoplastic Composite

right proportion of white dwarf core material and accreted material from the companion star was absolutely necessary for the simulations to work. .

MATÉRIAUX POUR L'ÉNERGIE

Novel technology aims to improve lithium metal battery life, safety

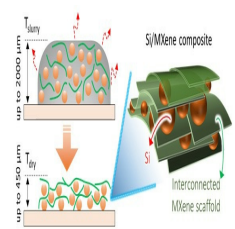
11/03/2019 - www.sciencedaily.com



As the demand for higher-energy-density lithium metal batteries increases -- for electric vehicles, smartphones, and drones -- stability of the SEI has been a critical issue halting their advancement because a salt layer on the surface of the battery's lithium electrode insulates it and conducts lithium ions. "The polymer that Yue and Donghai designed reacts to make a claw-like bond to the lithium metal surface. The reactive polymer also decreases the weight and manufacturing cost, further enhancing the future of lithium metal batteries.

Expanding the Use of Silicon in Batteries — By Preventing Electrodes from Expanding

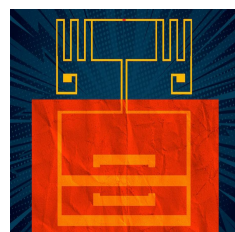
07/03/2019 - www.techbriefs.com



During the slurry-casting process, sheets of MXene material combine with silicon particles to form a network that allows for a more orderly reception of lithium ions, which prevents the silicon anode from expanding and breaking. Most solutions to this problem have involved adding carbon materials and polymer binders to create a framework to contain the silicon, which is a complex process. The silicon-MXene anodes had on the order of 100 to 1,000 times higher conductivity than conventional silicon anodes. .

Converting Wi-Fi Signals to Electricity with New 2-D Materials

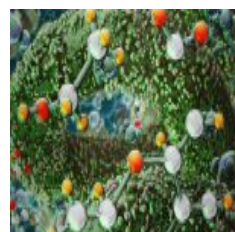
07/03/2019 - www.techbriefs.com



These materials can cover the Wi-Fi band, but they are rigid. In doing so, the team leveraged a singular behavior of MoS2: when exposed to certain chemicals, the material's atoms rearrange in a way that acts like a switch, forcing a phase transition from a semiconductor to a metallic material. "By engineering MoS2 into a 2-D semiconducting-metallic phase junction, we built an atomically thin, ultrafast Schottky diode that simultaneously minimizes the series resistance and parasitic capacitance," said researcher Xu Zhang.

LLNL scientists' novel 3D printed bioink speeds up ethanol production

07/03/2019 - 3dprintingindustry.com



"This is the first demonstration for 3D printing immobilized live cells to create chemical reactors," said Dr. Eric B. Duoss, an LLNL engineer and a co-author of the research. An LLNL team 3D printed live yeast cells on lattices. The LLNL team 3D printed freeze-dried live biocatalytic yeast cells, known as *Saccharomyces cerevisiae*, into complex structures to foster the conversion of glucose to ethanol and CO2. For more on 3D printing in academia, subscribe to the 3D Printing Industry Newsletter , follow us on Twitter , like us on Facebook.

Machine learning used to quickly analyze key capacitor materials

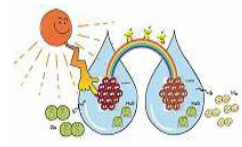
04/03/2019 - www.sciencedaily.com

Office of Naval Research, involves teaching a computer to analyze at an atomic level two materials that make up some capacitors: aluminum and polyethylene. Ramprasad and his colleagues, who specialize in using machine learning to help develop new materials,

used a sample of data created from a quantum mechanics analysis of aluminum and polyethylene as an input to teach a powerful computer how to simulate that analysis. While the study focused on aluminum and polyethylene, machine learning could be used to analyze the electronic structure of a wide range materials.

A water-splitting catalyst unlike any other

28/02/2019 - www.terraily.com

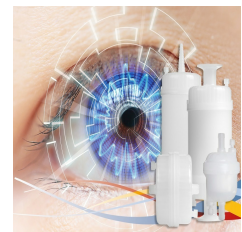


To do this, the researchers established a long-term collaboration program with the group of Professor Hao Ming Chen in National Taiwan University. precipitation change under global warming is essential. However, current climate models exhibit large uncertainty on the projection of Sahel precipitation.

MATÉRIAUX POUR L'OPTIQUE

Monomer Filtration Critical for Soft Contact Lens Production

28/02/2019 - www.azom.com



To ensure their monomer was free of any impurities before being used in the lens manufacturing process, the company employed pleated polypropylene capsule filters, rated at 1.2µm, 2.5µm and 5µm. Following an extensive technical review of the monomer manufacturing process, Amazon Filters offered a high performance SupaPore PCG capsule filter to replace the filters the company had traditionally used.

COLLAGES –ADHÉSIFS

Researchers Use High-Performance Computer Simulations to Observe the Process of Adhesive Wear

11/03/2019 - www.azom.com

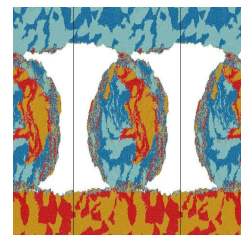
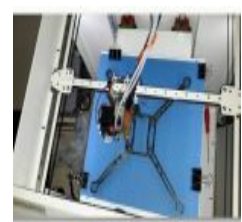


Image of the computer simulation showing adhesive wear on a self-affine surface. This is the third adhesive wear study performed by LSMS researchers. Their initial research, reported in 2016 in Nature Communications, applied digital simulations to elucidate how fine particles were produced through the process of adhesive wear. In the coming days, the LSMS investigators hope to study the origins of adhesive wear by utilizing their simulation method on 3D models of materials that are significant to the industry.

COMPOSITES

Anisoprint to introduce 3D printing technology for high-performance composite materials

08/03/2019 - 3dprintingindustry.com



Founded in 2015, Anisoprint develops desktop 3D printers capable of processing composite materials, producing structural parts with increased mechanical properties. Anisoprint technology integrates a composite reinforcing fiber in the form of a tow (a coarse, broken fiber) made of thousands of ultrathin carbon monofilaments, into a plastic during 3D printing. For more on 3D printing in news, subscribe to the 3D Printing Industry Newsletter , follow us on Twitter , like us on Facebook.

MÉTAUX

Researchers Develop New Method for Easily Cutting and Shaping Metals

08/03/2019 - www.azom.com

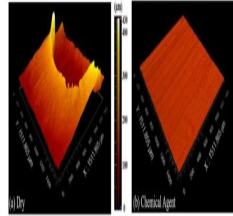
A Purdue University team created a method for applying a designer surface-active agent to the surface of a metal to make it easier to cut and shape the material into parts and pieces. The research team from Purdue



developed a process for applying a designer surface-active agent—labeled for a range of chemicals used in metal processing—on a metal's surface to make it easier to cut and shape the material into small parts. Scientists at Purdue could cut the metal more easily, with at least 50% less force, by using standard alcohols on an aluminum surface.

Design treatment of advanced metals producing better sculpting

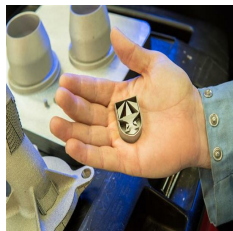
07/03/2019 - www.sciencedaily.com



The Purdue team created a method for applying a designer surface-active agent -- the name for a variety of chemicals used in metals processing -- to the surface of a metal to make it easier to cut and shape the material into parts and pieces. Researchers at Purdue used common alcohols on an aluminum surface and were able to cut the metal more easily, with at least 50 percent less force, and produce a smoother end surface with fewer cracks and tears compared with aluminum without the alcohol treatment.

US army works with air force-invented steel alloy to 3D print ultra-strong steel parts

05/03/2019 - www.3ders.org

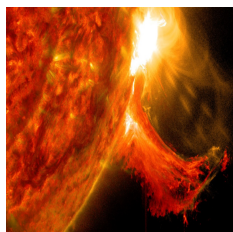


Army Combat Capabilities Development Command's Army Research Laboratory, materials manufacturing scientists are 3D printing intricate geometries with ultra-high-strength using air force-invented steel alloy. While progress remains steady, McWilliams said reliable 3D printed metal parts is still a long way off; however its benefits will be substantial. Unlike the binder jet 3D printing that uses a binder liquid to glue together building material's particles, the powder bed fusion techniques use an electron beam as the energy source for the melting process.

NANOMATÉRIAUX

Ice cores reveal huge solar storm struck Earth around 660 BC

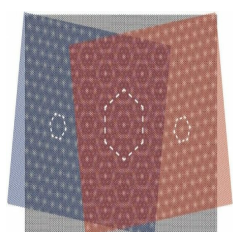
12/03/2019 - physicsworld.com



An intense blast of high-energy protons from the Sun pummelled the Earth in about 660 BC and left a distinct record of cosmogenic nuclei in the Greenland ice sheet. The discovery was made by an international team of scientists who say the event was one most powerful solar storms known to have struck Earth.

The moiré patterns of three layers change the electronic properties of graphene

08/03/2019 - www.sciencedaily.com



Last year, researchers in the US caused a big stir when they showed that rotating two stacked graphene layers by a "magical" angle of 1.1 degrees turns graphene superconducting -- a striking example of how the combination of atomically thin materials can produce completely new electrical properties. Lujun Wang, a member of the SNI PhD School and researcher in Schönenberger's team, also observed effects of this kind of superlattice when he combined layers of boron nitride and graphene.

POLYMÈRES - ÉLASTOMÈRES

Braskem Launches New Grade of Polypropylene Resin to Increase Big Bag Production

07/03/2019 - www.azom.com



In the search for solutions that increase productivity and reduce the costs of clients who produce big bags (used for packing and transporting grains, fertilizers, ores, and chemicals), Braskem has developed the new DP213A polypropylene resin, the new grade of the Maxio line. DP213A Polypropylene Resin: Low Melt Flow Index DP213A is a resin with a low melt flow index containing anti-UV additive.

Scientists develop 3D printed plastic-composite sensor capable of detecting changes in water

05/03/2019 - www.3ders.org



"This work shows the first 3D printed composite objects created from a non-porous coordination polymer," says co-author Félix Zamora from the Autonomous University of Madrid. "It opens the door to the use of this large family of compounds that are easy to synthesize and exhibit interesting magnetic, conductive and optical properties, in the field of functional 3D printing.

SEMI-CONDUCTEURS

Mele, Kane Win Frontiers of Knowledge Award for Discovering Topological Insulators

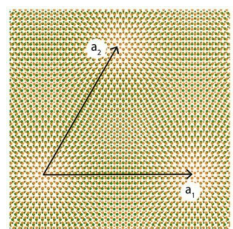
08/03/2019 - www.photonics.com



Physicists Charles Kane and Eugene Mele are the recipients of the 2019 Frontiers of Knowledge Award, for discovering topological insulators, described as a new class of materials with extraordinary electronic properties. Committee members also explained that metallic materials conduct electricity whereas insulators do not. That did not stop Kane and Mele from predicting in 2005 that this simple classification fails for a new class of materials called topological insulators, whose existence was experimentally confirmed soon thereafter.

When semiconductors stick together, materials go quantum

07/03/2019 - www.sciencedaily.com



A team of researchers led by the Department of Energy's Lawrence Berkeley National Laboratory (Berkeley Lab) has developed a simple method that could turn ordinary semiconducting materials into quantum machines -- superthin devices marked by extraordinary electronic behavior. Out of this body of work, other researchers had discovered that moiré superlattices formed with graphene exhibit exotic physics such as superconductivity when the layers are aligned at just the right angle.

THERMOPLASTIQUES

SFS Intec Partners with TXV to Re-engineer Aircraft Bracket Using High Performance Thermoplastic Composite

11/03/2019 - www.azom.com



To achieve valuable weight and cost savings within the quality and price-sensitive air transportation industry, SFS Intec is partnering with TxV Aero Composites in the re-design of an aircraft storage bin bracket. Originally made from aluminum, the new bracket will be made of VICTREX AE™ 250 composites overmolded with VICTREX™ PEEK(polyetheretherketone) polymer. SFS Aircraft Storage Bin Bracket Sascha Costabel, Head of Innovation at SFS Intec GmbH Aircraft Components said, "Our decision to work with TxV is a strategic one.

Pour toute information, merci de [nous contacter](#)