Matériaux

Bulletin de Veille - 24 août 2018

SOMMAIRE

GENERALITES - MATERIAUX

Scientists create a mineral in the lab that captures carbon dioxide

22/08/2018 - www.sciencenews.org

Previous researchers have considered pumping CO2 deep into Earth's interior, where high temperatures and pressures can speed up the gas's reaction with a magnesium-bearing upper mantle rock called olivine. Under very high temperatures, scientists can quickly create magnesite in the lab, using olivine as a feedstock. To get around this problem, Power and his colleagues used thousands of tiny polystyrene microspheres, each about 20 micrometers in diameter, as catalysts to speed up the reaction.

Engineering team designs technology for smart materials

18/08/2018 - www.sciencedaily.com

University of Virginia mechanical engineers and materials scientists, in collaboration with materials scientists at Penn State, the University of Maryland and the National Institute of Standards and Technology, have invented a "switching effect" for thermal conductivity and mechanical properties that can be incorporated into the fabrication of materials including textiles and garments.

Cars and Planes Are Safer Thanks to This Tool Developed for Shuttle

07/08/2018 - www.spacedaily.com

Stereo photogrammetry is "like using your two eyes to know where something is in 3D space," explains John Tyson, president of Trilion Quality Systems, the company that built the high-speed system NASA used. When Adidas wanted to design a new high-performance running shoe, it used the high-speed ARAMIS system to analyze Olympic marathoners' feet as they hit the ground. In addition to providing detailed and accurate measurements across a surface, Tyson says, the high-speed ARAMIS system saves money.

AEROSPATIAL

NextFlex Launches $10 Million Funding Round for Flexible Hybrid Electronics Innovations in Aviation, Digital Health and National Security

06/08/2018 - www.businesswire.com

NextFlex®, America's Flexible Hybrid Electronics (FHE) Manufacturing Institute, today released Project Call 4.0 (PC 4.0) — the latest call for proposals to fund projects that seek to

further the development and adoption of FHE. Topics in Project Call 4.0 build upon successful developments and learning from our previous project calls. NextFlex ®, America's Flexible Hybrid Electronics Manufacturing Institute, is a leading force in the Manufacturing USA network of Institutes.

MATERIAUX POUR L'ENERGIE

Australian Graphite Successfully Used in Full-Cell Li-ion Batteries

22/08/2018 - www.azom.com

With the global lithium-ion battery market forecast to grow over the next 10 years to US$130 billion, the outcomes of the innovative work will be used by Archer to target potential offtake partners in the lithium-ion battery supply chain and electric vehicle markets.

High-efficiency large-area perovskite photovoltaic modules achieved via electrochemically assembled metal-filamentary nanoelectrodes

17/08/2018 - advances.sciencemag.org

In addition, we successfully achieved high module PCEs of 15.4% in a small-sized 1.21-cm2 module and 13.3% in a large-area 9.06-cm2 module composed of copper (Cu) filamentary nanoelectrodes (CFNs) by replacing the expensive Ag electrodes with stable and low-cost Cu electrodes, implying that the electrochemically induced patterning process may be universally applicable for various metal electrode systems (Fig.

U.S. Army Research Lab to license nanogalvanic aluminium powder for hydrogen generation

13/08/2018 - www.metal-am.com

The U.S. Army Research Laboratory, Adelphi, Maryland, USA, has reported plans to license its discovery of a nanogalvanic aluminium powder for hydrogen generation. When combined with water or any water-based liquid, the novel, structurally-stable, aluminium-based nanogalvanic alloy powder reacts to produce on-demand hydrogen for power generation without a catalyst. Scientists on the project have speculated that, among other applications, it could potentially be used in metal Additive Manufacturing to create self-cannibalising robots/drones

Expanding the limits of Li-ion batteries: Electrodes for all-solid-state batteries

09/08/2018 - www.spacedaily.com

The SpaceDaily news network continues to grow but revenues have never been harder to maintain. Engine flaw delays Boeing test of crew capsule to 2019 Crewed Missions Beyond LEO Space tourism economics - financing and regulating trips to the final frontier Space Station experiment reaches ultracold milestone.

MATERIAUX POUR L'OPTIQUE

Scientists reduced the weight of optics for satellite observation by 100 times

12/08/2018 - www.spacedaily.com

This optical element, created by the research group of the Department of Supercomputers and General Informatics of Samara University, weighs only 5 grams and replaces a complex and massive system of lenses and mirrors similar to the one that is used in telephoto lenses with a focal length of 300 mm and a weight of 500 grams. "To solve the problems in the areas where there is a constant struggle for the reduction of the weight and size of the optics, such massive systems are not suitable.

Scientists create a UV detector based on nanocrystals synthesized by using ion implantation

09/08/2018 - www.solardaily.com

Scientists at the Lobachevsky University have been working for several years to develop solar-blind photodetectors operating in the UV spectral band. In the field of electronic technology, this is an important task, since such devices cut off emission with a wavelength higher than 280 nm, which helps to avoid interference from sunlight and to record UV emission during daylight.

Glass Doped with Erbium Could be Used for Optical Circuits

08/08/2018 - www.photonics.com

A material created by doping glass made from zinc, sodium, and tellurium with the rare earth element erbium could be used for broadband planar waveguide amplifiers. Researchers report on a laser-assisted study of a type of glass that shows promise as a material for broadband planar waveguide amplifiers.

COLLAGES –ADHESIFS

DELO Presents Solvent-free Activators

17/08/2018 - www.azom.com

DELO has developed two new activators accelerating the adhesion build-up of metal adhesives such as DELO-ML. This is not necessary for the low-viscous DELO-QUICK 5910 and the higher-viscous DELO-QUICK 5975. In addition, the fluorescent agents contained in the activators – a bluish one in DELO-QUICK 5910 and a reddish one in DELO-QUICK 5975 – allow the application process to be monitored visually via a camera, ensuring quality assurance. With DELO-QUICK 5975, this is even the case for nickel, which is considered difficult to bond because of its different coatings.

High Tensile Strength Epoxy Adhesive Utilizes Renewable Biomaterial

10/08/2018 - www.azom.com

Master Bond EP70CN is a two part, thermally stable epoxy adhesive formulated using a natural, renewable and sustainable ingredient. This epoxy system forms high physical strength bonds and can be utilized for bonding, sealing, coating and potting. “The tensile strength is 11,000 to 12,000 psi and the tensile modulus, 300,000 to 350,000 psi. It features a glass transition temperature of 130 to 135 °C”, says Rohit Ramnath, Senior Product Engineer. “The EP70CN has a very good chemical resistance profile when cured at the optimal cure schedule.”

COMPOSITES

Novel sensors could enable smarter textiles

16/08/2018 - www.sciencedaily.com

The nanocomposite coating developed by Thostenson's group is flexible and pleasant to the touch and has been tested on a range of natural and synthetic fibers, including Kevlar, wool, nylon, Spandex and polyester. The coatings are just 250 to 750 nanometers thick -- about 0.25 to 0.75 percent as thick as a piece of paper -- and would only add about a gram of weight to a typical shoe or garment.

METAUX

Microcable Capabilities for Smaller Applications

06/08/2018 - www.azom.com

With a 40-year history of stranding at Fort Wayne Metals, we continue to expand our expertise, capabilities, and technologies to better serve our customers. We have invested heavily in our stranding technologies to process ultrafine wires that range from 0.0005 to 0.003 inches (0.013 to 0.076 mm), where 37 wire strands now take the place of 19 wire strands, with no increase to the finished product diameter. A strand may have as few as three wires twisted together, to as many as 703 wires in a 19x37 cable; that’s 19 strands of 37 wires in a single cable.

Strange metals are even weirder than scientists thought

06/08/2018 - www.sciencenews.org

A type of strange metal called a cuprate behaves unexpectedly when inside a strong magnetic field , the team reports in the Aug. So he and colleagues studied how the cuprate behaved in extremely strong magnetic fields, up to almost 2 million times the strength of Earth’s magnetic field. The researchers showed that when the magnetic field is ramped up, the strange metal exhibits similarly weird behavior as it does with temperature.

NANOMATERIAUX

Hybrid nanomaterials bristle with potential

14/08/2018 - www.nanodaily.com

Although several methods exist to create two-layer materials, making three-layered structures has proven much more difficult, says Peng Wang from the Water Desalination and Reuse Center who co-led the current research with Professor Yu Han, member of the Advanced Membranes and Porous Materials Center at KAUST. The resulting substance (image 3) had the structure Co9S8, Ni3S2@HsGDY@Ni,Co-MoS2, in which the conductive organic HsGDY layer is sandwiched between two inorganic layers (image 4).

POLYMERES - ELASTOMERES

Saint-Gobain Seals Extends Space Footprint into Asia by Exhibiting OmniSeal® Spring-Energized Seals and Meldin® Thermoset Materials at Bengaluru Space Expo

16/08/2018 - www.azom.com

Saint-Gobain Seals will be exhibiting at the Bengaluru Space Expo from September 6 to 8, Hall #1, Booth A-6, to extend its space footprint into Asia by showcasing its sealing and polymer products: OmniSeal® spring-energized seals and Meldin® high-temperature thermoset materials.

Separation & Characterisation of Self Assembling Block Copolymers

13/08/2018 - www.azom.com

Thermal Field-Flow Fractionation is a technique which is ideally suited for the characterization of polymers, gels and nanoparticles using different organic solvents and to get additional chemical information about the polymers. The measurements for this research study were performed using a Postnova Analytics TF2000 thermal field-flow fractionation system coupled in series to MALS and RI detectors as well as a Malvern Instruments Zetasizer Nano system.

General Plastics Launches High-Temperature, Low CTE LAST-A-FOAM® FR-4800 Tooling Board

09/08/2018 - www.azom.com

General Plastics Manufacturing Company, a global supplier of high-performance polyurethane foam products and composite parts, today announced the launch of LAST-A-FOAM® FR-4800 high-temperature tooling board. [FR-4800 High Temp Tooling Board] The FR-4800 tooling board provides a much-needed high-temperature, low CTE tooling board alternative that enables the manufacture of tools and parts for prototypes, concept proofs, and short-run production parts.

REVETEMENTS

Transparent 3D printable nanostructures can mimic natural colors

21/08/2018 - 3dprintingindustry.com

(The design tool shows light hitting a 3D printed nanostructure from below. Now, with the intention of reducing the use of potentially toxic industrial pigments, which also cannot produce certain color patterns, this design tool automatically creates 3D printable templates for nanostructures that correspond to specific colors. The design tool permits users to enter their desired color, then replicates it through a 3D model nanostructure pattern rather than attempting to reproduce structures found in nature.

SEMI-CONDUCTEURS

Magnetic antiparticles offer new horizons for information technologies

15/08/2018 - www.sciencedaily.com

Because they move differently, the skyrmions created readily propagate away while the trochoidal motion of antiskyrmions means that they remain more localized to where they are created. Because of the asymmetry in the motion of skyrmion and antiskyrmions, the simulations show that there is always an excess of skyrmions after pair creation, so the

imbalance between "matter" and "antimatter" in these ferromagnetic films is a natural consequence of their dynamics at high energies.

Extreme conditions in semiconductors

09/08/2018 - www.spacedaily.com

Scientists from the University of Konstanz and Paderborn University have succeeded in producing and demonstrating what is known as Wannier-Stark localization for the first time.

Tiny Defects in Semiconductors Created ‘Speed Bumps’ or Electrons. UCLA Researchers Cleared the Path

08/08/2018 - www.techbriefs.com

Their method joins a semiconductor layer and a metal electrode layer without the atomic-level defects that typically occur when other processes are used to build semiconductor-based devices. The electrodes in semiconductor-based devices are what enable electrons to travel to and from the semiconductor; the electrons can carry computing information or energy to power a device. Using the theory, engineers should be able to select the metal that allows electrons to move across the junction between metal and semiconductor with the smallest amount of energy.

Novel Material Demonstrates Quantum Properties

06/08/2018 - www.photonics.com

. Researchers have discovered a novel material with multiple quantum properties: Hf2Te2P, a material that is chemically composed of hafnium, tellurium, and phosphorus. The team is using angle-resolved photoemission spectroscopy (ARPES) and first-principles electronic structure calculations to characterize the metallic material. In experiments using ARPES, the University of Central Florida (UCF) team has observed weak topological insulator surface states in Hf2Te2P. The team’s calculations suggest additional strong topological insulator surface states.