Matériaux

Bulletin de Veille - 05 avril 2019

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GÉNÉRALITÉS - MATÉRIAUX

In New Material, Color and Thermal Properties Can Be Tuned Separately

04/04/2019 - www.photonics.com

By controlling the degree to which the material was stretched, the researchers could control the polyethylene's heat-conducting properties, regardless of the material's color. They demonstrated a variety of dark- and bright-colored composite samples that exhibited reduced temperatures under direct illumination by sunlight, According to the researchers, the lightweight semicrystalline polymer matrix yields thermal conductivity exceeding that of many metals.

AMRC to hold lightweighting conference this May

21/03/2019 - www.metal-am.com

The Advanced Manufacturing Research Centre (AMRC), University of Sheffield, South Yorkshire, UK, will hold its Lightweighting Conference: Winning the Weight Race, from May 15–16, 2019. Guided tours will be given to showcase the AMRC's current lightweighting abilities at a number of its facilities. Further information on the conference programme and registration details are available via the AMRC website.

AÉROSPATIAL

Ventec Upgrades ISO 7 Aerospace-Standard Prepreg & Laminate Clean-Room Facility in Germany

04/04/2019 - www.azom.com

Ventec International Group Co., Ltd. (6672 TT), a world leader in the production of polyimide & high reliability epoxy laminates and prepregs and specialist provider of thermal management and IMS solutions, is pleased to announce the completion of a new upgraded temperature & humidity-controlled ISO 7 (Class 10000) clean-room at its German facility. The upgrade forms part of Ventec's ongoing investment in the establishment and maintenance of meticulous aerospace-standard cleanliness in the prepreg handling areas of the state-of-the-art quick-turn manufacturing & distribution centers in Germany and key locations around the world.

Metal asteroids may have once had iron-spewing volcanoes

03/04/2019 - www.sciencenews.org

Imagine a metal asteroid spewing molten iron, and you've got the gist of ferrovolcanism — a new type of planetary activity proposed recently by two research teams. Metal asteroids are thought to be the exposed iron-rich cores of planetesimals that suffered a catastrophic collision as the solar system was developing, before they could grow into full-sized planets. If a cooling iron core also contained a little bit of rock and sulfur,

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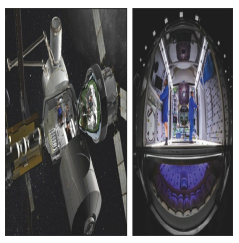
he theorizes, the core could have been cocooned beneath a rocky, not iron, crust.

Lockheed Martin Explores a Different Kind of Space for NASA

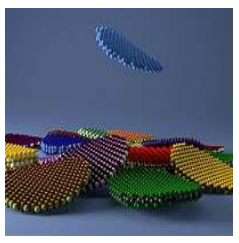
01/04/2019 - www.techbriefs.com



Today, NASA is developing the Orion spacecraft that will launch astronauts back into lunar orbit, to the Moon's surface and, if all goes as scheduled, to Mars. Protolabs is one of the companies making NASA's dream journey a reality, providing sheet metal fabrication capabilities to Lockheed Martin, a major NASA contractor for this critical next step to the Moon. Left: NASA is developing the Orion spaceship, including NASA's Gateway port living quarters, as seen in this concept.

ANU research set to shake up space missions

17/03/2019 - www.spacedaily.com

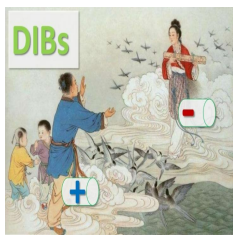


It could influence the type of materials used to build everything from satellite electronics to solar cells and batteries - making future space missions more accessible, and cheaper to launch. "The applications of these 2D materials will be quite versatile, from satellite structures reinforced with graphene - which is five-times stiffer than steel - to lighter and more efficient solar cells, which will help when it comes to actually getting the experiment into space.

MATÉRIAUX POUR L'ÉNERGIE

Researchers Design Highly Efficient Aluminum–Graphite Dual-Ion Batteries at Low Cost

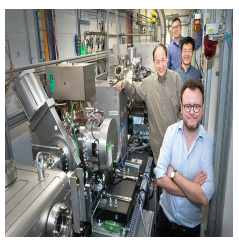
29/03/2019 - www.azom.com



The effective development of a cheap and eco-friendly sodium-based DIB—the potassium-ion-based DIB—and the high-working-voltage calcium-ion battery at ambient temperature by the researchers laid a firm groundwork for the industrial application of such integrated technology.

Scientists Identify Causes of Degradation in Cathode Material for Lithium-Ion Batteries

18/03/2019 - www.azom.com



Presently, the most common type of battery found in electric vehicles is lithium-ion batteries; however, their high cost and restricted lifetimes are drawbacks to the extensive deployment of electric vehicles. Although it finds successful application in small energy storage systems, for example, portable electronics, cobalt's toxicity and cost are hurdles for the material's use in bigger systems. To completely understand this process in their nickel-rich layered materials, the researchers had to use multiple research methods to evaluate the material from various viewpoints.

MATÉRIAUX POUR L'OPTIQUE

New Glass Family Demonstrates High Refractive Index, UV-Shielding Properties

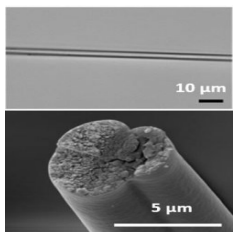
04/04/2019 - www.photonics.com

The new family of zinc germanosilicate glass was invented by a research group at The Pennsylvania State University (Penn State). Ye Luo (right), doctoral student in materials science and engineering, pours the new composition of germanosilicate glass into form. "The motivation for the study was the need for new glass compositions that have a high refractive index while still being processable at an industrial scale," said professor John Mauro.

BIOMIMÉTIQUE

Bacterial factories could manufacture high-performance proteins for space missions

02/04/2019 - www.sciencedaily.com



Then, the researchers could assemble the shorter proteins into the longer spider silk fiber. Split inteins are naturally occurring protein sequences with enzymatic activity: Two split inteins on different protein fragments can join and then cut themselves out to yield an intact protein. The researchers can make various repetitive proteins simply by swapping out the spider silk DNA and putting other sequences into bacteria. For example, the researchers used the technique to make a protein from mussels that adheres strongly to surfaces.

COLLAGES –ADHÉSIFS

A laser technique proves effective to recover material designed to protect industrial products

18/03/2019 - www.sciencedaily.com

To deal with this, the Manufacturing Processes Engineering research group at the University of Cordoba has validated a new method to take off these kinds of coatings using a laser technique. As researcher Guillermo Guerrero Vaca, one of the authors of the paper, explained to us, the results show that the technique behaves effectively, especially for one kind of fluoropolymer, PTFE, so "we can conclude that it could be an alternative for these kinds of coatings instead of other kinds of methods.

COMPOSITES

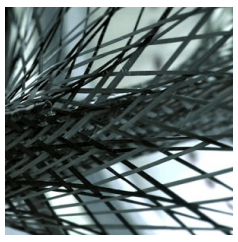
Innovation in Composites: A Major Breakthrough in Time and Cost Efficient Production of Complex Aircraft Parts

04/04/2019 - www.azom.com

It holds enormous potential and serves as further evidence that Victrex has introduced the next dimension of thermoplastic composites for use in aerospace based on its high-performing VICTREX PAEK polymer solutions. The process was developed by the Institute of Lightweight Engineering and Polymer Technology (TU Dresden) and herone GmbH for use in the manufacture of high quality continuous carbon fiber PAEK composite hollow profiles.

Teijin Presents High-Performance Composite Products at JEC World 2019

20/03/2019 - www.azom.com



Ziegler GmbH at JEC World 2019 is a proof of its wide range of solutions with its high-performance materials and composites for a diverse array of applications such as aerospace, automotive, marine, civil engineering, energy, oil and gas, sporting goods, heat and flame protection and ballistics. A helicopter seat armored by an Twaron /Tenax blend will be showcased to underline the manifold solutions possible with the comprehensive product range of Teijin’s high-performance fibers.

NANOMATÉRIAUX

Graphene additives promote ‘eco-friendly’ corrosion protection

04/04/2019 - physicsworld.com

The right formulation Using these observations, developers at The Sixth Element have produced a 2K epoxy primer formulation (containing 25% zinc powder and 1% graphene by dry-film weight) that fulfils all requirements for highly corrosive environments, if the appropriate medium and top coating are applied. In another experiment, a water-based 2K epoxy system formulated with 45% zinc powder and 1% graphene showed exceptional corrosion-protection properties,

withstanding 2400 hours in standard salt spray testing.

POLYMÈRES - ÉLASTOMÈRES

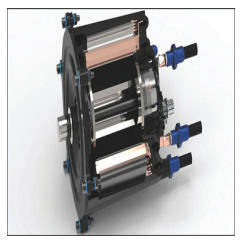
New see-through film stronger than aluminum

04/04/2019 - www.spacedaily.com

"The microstructure of polymers before drawing very much resembles that of a bowl of cooked spaghetti or noodles, while after stretching or drawing the molecules become aligned in a way similar to that of uncooked spaghetti, meaning that they can carry more load," Yunyin Lin, a PhD student with Peijs and Bastiaansen, said in a news release. "We expect greater polymer chain mobility at these high drawing temperatures to be responsible for creating fewer defects in the drawn films, resulting in less light scattering by defects and therefore a higher clarity," Peijs said.

Directly Cooled Electric Motor Made from Polymer Materials

01/04/2019 - www.techbriefs.com

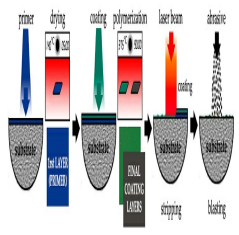


Making electric cars lighter also involves reducing the weight of the motor. A new cooling concept was developed that will enable polymers to be used as motor housing materials, increasing the power density and efficiency of the motor compared to the state-of-the-art. In addition, the new design incorporates a rotor cooling solution that also allows the rotor's heat loss to be dissipated directly within the motor. The metal currently required as a heat conductor can be replaced by polymer materials, which have a low thermal conductivity compared to metals.

REVÊTEMENTS

Industrial Laser Proves Effective at Removing Nonstick Coatings

22/03/2019 - www.photonics.com

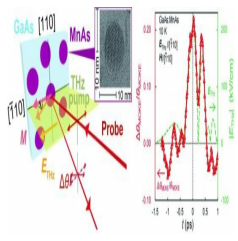


The researchers compared stripping processes for FEP and PTFE nonstick fluoropolymer coatings, analyzed the qualities of each coating and the coating's degree of influence on the energy efficiency and rate of stripping, and how the stripping process affected the mechanical and superficial properties of the aluminum substrate. The Nd:YAG laser stripping of PTFE coatings appeared to produce a smaller increase in Ra and Rz roughness on substrates than that produced in the case of FEP coatings.

SEMI-CONDUCTEURS

Ferromagnetic nanoparticle systems show promise for ultrahigh-speed spintronics

28/03/2019 - www.sciencedaily.com



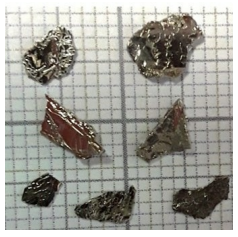
Generally, the "magnetic field" component of a terahertz pulse is considered to be the origin of the coherent terahertz response of the magnetization. But, as a group of University of Tokyo researchers previously discovered, the "electric field" component of a terahertz pulse plays a key role in the terahertz magnetization modulation of semiconductor-based ferromagnetic materials. "This strong electric field induces the large magnetization modulation via the modulation of the carrier density in the MnAs nanoparticles, thanks to the spin-orbit interaction.

TERRES RARES

New Alternatives May Ease Demand for Scarce Rare-Earth Permanent Magnets

04/04/2019 - www.azom.com

With these additives, the team anticipates that CeCo5 could someday be used in place of the strongest rare-earth magnets that contain



neodymium (Nd) and dysprosium (Dy), thus easing demand for those critical elements. To that end, the group continues to use their strategy to optimize the key characteristics of poor magnets or non-magnets to transform them into alternatives that are completely free of rare-earth elements. The resulting compound’s high magnetization is comparable with the best Nd-based magnets.

THERMOPLASTIQUES

New Recyclable Self-Reinforced PLA Composites for Auto & Medical Applications

20/03/2019 - www.azom.com

Two different PLA grades are required to produce SRPCs: a low melting temperature PLA grade to form the matrix and an ultra-high stiffness and high melting temperature PLA grade to form the reinforcing fibers. The two PLA grades selected for Bio4self have a melting temperature difference of about 20°C, leaving a sufficient temperature processing window.

Hexcel et Arkema ouvrent un laboratoire commun pour les composites thermoplastiques

18/03/2019 - www.industrie-techno.com

Hexcel et Arkema misent sur les composites thermoplastiques Le spécialiste des matériaux composites Hexcel et le chimiste français Arkema ont annoncé l’ouverture d’un centre de recherche commun pour le développement de pré-imprégnés thermoplastiques. L’objectif est d’associer le savoir-faire de l’entreprise américaine dans le domaine des fibres de carbone et l’expertise du chimiste dans le domaine des résines thermoplastiques techniques haut de gamme.