

Matériaux

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GENERALITES

Liquid crystals and the origin of life

03/10/2018 - www.sciencedaily.com



They found that at high concentrations, short RNA sequences (either 6 or 12 nucleotides long) spontaneously ordered into liquid crystal phases. Liquid crystals formed even more readily when the researchers added magnesium ions, which stabilized the crystals, or polyethylene glycol, which sequestered RNA into highly concentrated microdomains. The researchers point out that polyethylene glycol and the chemical activator would not be found under primordial conditions, but they say that other molecular species could have played similar, if less efficient, roles.

Picosun-SINANO collaboration yields excellent TiN process

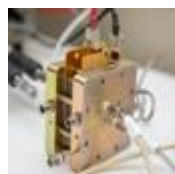
27/09/2018 - www.azom.com

Picosun Group, a leading, global provider of ALD (Atomic Layer Deposition) thin film coating solutions, and Suzhou Institute of Nano-Tech and Nano-Bionics (SINANO) report excellent quality titanium nitride (TiN) deposited with Picosun's plasma-ALD technology.

MATERIAUX POUR L'ENERGIE

New fuel cell concept brings biological design to better electricity generation

03/10/2018 - www.sciencedaily.com



In a new approach, inspired by biology and published today (Oct. 3, 2018) in the journal Joule, a University of Wisconsin-Madison team has designed a fuel cell using cheaper materials and an organic compound that shuttles electrons and protons. "The problem is, when you attach too much of a catalyst to an electrode, the material becomes less effective," he says, "leading to a loss of energy efficiency. The team's solution was to pack a lower-cost metal, cobalt, into a reactor nearby, where the larger quantity of material doesn't interfere with its performance."

MATERIAUX POUR L'OPTIQUE

Defects in Semiconductor Enable Qubits that Emit Photons in IR

02/10/2018 - www.photonics.com

NANOMATERIAUX

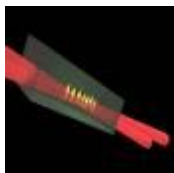
- Big discoveries about tiny particles
- Precise control of multimetallic one-nanometer cluster formation achieved
- Nucleation a boon to sustainable nanomanufacturing

SEMI-CONDUCTEURS

- Route to flexible electronics made from exotic materials

THERMOPLASTIQUES

- Key Considerations when 3D Printing with Thermoplastics



A metal-gate process that uses aluminum for the metal-oxide semiconductor (MOS) gate electrode as well as for signal and power supply connectors. quantum optics The area of optics in which quantum theory is used to describe light in discrete units or "quanta" of energy known as photons.

New electro-optic laser pulses 100 times faster than usual ultrafast light

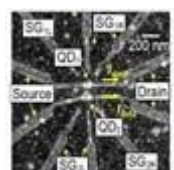
27/09/2018 - www.sciencedaily.com



Physicists at the National Institute of Standards and Technology (NIST) have used common electronics to build a laser that pulses 100 times more often than conventional ultrafast lasers. "Chemical and biological imaging is a good example of the applications for this type of laser," Papp said. The combination of reliability and accuracy makes electro-optic combs attractive for long-term measurements of optical clock networks or communications or sensor systems in which data needs to be acquired faster than is currently possible.

Two quantum dots are better than one: Using one dot to sense changes in another

27/09/2018 - www.nanodaily.com

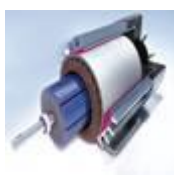


Researchers at Osaka University have recently developed the first device based on two self-assembled quantum dots that can measure the single-electron charge of one quantum dot using a second as a sensor. An electronic device using self-assembled quantum dots to detect single-electron events is a novel strategy for increasing our understanding of the physics of quantum dots and to aid the development of advanced nanoelectronics and quantum computing.

COLLAGES –ADHESIFS

New Structural Adhesive with High Temperature Stability

27/09/2018 - www.azom.com



With DELO MONOPOX HT2860, DELO has now developed a structural adhesive with a glass transition temperature (Tg) of +168 °C. As a result, the Young's modulus below Tg does not change significantly, the adhesive achieves a very high temperature stability and the flexibility only increases above this temperature. Another advantage of the new structural adhesive is that the adhesive containers of DELO MONOPOX HT2860 can be processed in the production line at room temperature for four weeks before heat curing.

COMPOSITES

IRT Saint-Exupéry : les nouvelles plateformes technologiques opérationnelles

08/10/2018 - www.industrie-techno.com



Une plateforme matériaux composites Dans ses nouveaux locaux toulousains, l'IRT s'est aussi doté, au sein de sa plateforme dédiée aux matériaux composites d'un nouvel équipement, développé par ses propres équipes, en partenariat avec des PME françaises : une ligne d'imprégnation thermoplastique à échelle semi-industrielle, qui permet de tester en conditions réelles tous types de fibres et tout type de voie d'imprégnation.

PLD Space, RUAG Sign Agreement for Launch Vehicle Composite Structures Development

04/10/2018 - www.parabolicarc.com



Today, launch vehicle developer PLD Space and space industry supplier RUAG Space signed a long-term collaboration and Supply Agreement regarding lightweight carbon composite structures for small launch vehicles. PLD Space will apply FlexLine products from RUAG Space as a pilot customer on its new launchers, which are under development for servicing the emerging small satellite worldwide launch demand.

Hexcel complète son écosystème dédié aux composites

03/10/2018 - www.industrie-techno.com



Une recherche de nouveaux procédés La création de cet écosystème s'accompagne d'une accélération de la R&D du groupe, qui a notamment signé cette année un partenariat avec le chimiste français Arkema pour le développement de nappes de carbone dotées d'une matrice thermoplastique, plus faciles à mettre en oeuvre.

FDM Soluble Cores Simplify Production of Composite Parts

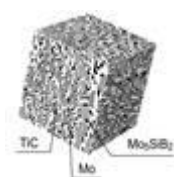
26/09/2018 - www.stratasysdirect.com

To build soluble cores, Stratasys Direct Manufacturing project engineers reverse how material is extruded from the machine, so that the 3D CAD model is built in support material and the thermoplastic acts as the support. You Might Be Interested In (mahle) 3D Printing Puts Fixtures into Gear Automotive parts supplier gets up to speed on FDM's capabilities for fixtures. Bell needed helicopter parts quickly and with a repeatable processes at a competitive cost with conventional manufacturing.

METAUX

Study Unravels Metal that Can Endure Constant Forces at Very High Temperatures

28/09/2018 - www.azom.com

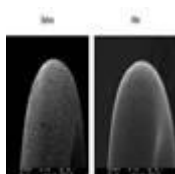


"This work suggests that the MoSiBTiC, as ultrahigh temperature material, beyond Nickel-based superalloys, is one promising candidate for those applications," added Yoshimi. The scientists evaluated the alloy's creep in a stress range of 100–300 MPa for 400 hours. "Our ultimate goal is to invent a novel ultrahigh temperature material superior to Nickel-based superalloys and

replace high-pressure turbine blades made of Nickel-based superalloys with new turbine blades of our ultrahigh temperature material," stated Yoshimi. .

3 Key Benefits: Better Corrosion Resistance, Fatigue Life, Part Integrity

27/09/2018 - www.techbriefs.com



Metal parts used in helicopters and airplanes must be able to withstand stress and corrosion with long-term use and must meet highly demanding cycle life specifications. By removing these imperfections on the surface of metal parts, engineers have found electropolishing to greatly improve the surface quality of components, which in turn leads to significant fatigue life improvement. It's an effective solution for deburring and maintaining part integrity.

NANOMATERIAUX

Big discoveries about tiny particles

08/10/2018 - www.sciencedaily.com



Now, Hojin Kim, a graduate student in chemical and biomolecular engineering at the University of Delaware, together with a team of collaborating scientists at the Max Planck Institute for Polymer Research in Germany, Princeton University and the University of Trento, has uncovered new insights about polymer nanoparticles. The characteristics of polymer nanoparticles differ from those of larger particles of the same material. For example, a disposable plastic cup made with the polymer polystyrene might hold up in boiling water -- but that cup doesn't have nanoparticles.

Precise control of multimetallic one-nanometer cluster formation achieved

01/10/2018 - www.nanodaily.com



The team successfully demonstrated the formation of five-element clusters composed of gallium (Ga), indium (In), gold (Au), bismuth (Bi) and tin (Sn), as well as iron (Fe), palladium (Pd), rhodium (Rh), antimony (Sb) and copper (Cu), and a six-element cluster consisting of Ga, In, Au, Bi, Sn and platinum (Pt).

Nucleation a boon to sustainable nanomanufacturing

27/09/2018 - www.nanodaily.com



Young-Shin Jun, professor of energy, environmental and chemical engineering in the School of Engineering and Applied Science, and Quingun Li, a former doctoral student in her lab, are the first to measure the activation energy and kinetic factors of calcium carbonate's nucleation, both key to predicting and controlling the process. Jun, an expert in the nucleation of solids, and her team explored ways to govern the speed and location of nucleation, as well as the shape of the emerging solids.

SEMI-CONDUCTEURS

Route to flexible electronics made from exotic materials

08/10/2018 - www.sciencedaily.com



In addition to graphene, they experimented with an intermediate layer of hexagonal boron nitride (hBN), a material that resembles graphene's atomic pattern and has a similar Teflon-like quality, enabling overlying materials to easily peel off once they are copied. Kim envisions that remote epitaxy can now be used to fabricate ultrathin, flexible films from a wide variety of previously exotic, semiconducting materials -- as long as the materials are made from atoms with a degree of polarity.

THERMOPLASTIQUES

Key Considerations when 3D Printing with Thermoplastics

26/09/2018 - www.stratasysdirect.com

Thermoplastics are typically used in manufacturing techniques like injection molding, compression molding and machining, but with the invention of 3D printing, they became available for additive extrusion and sintering processes. A new door to advanced manufacturing has opened with 3D printing materials similar to the conventional thermoplastics familiar to engineers and designers. The easiest way to identify the right FDM thermoplastic would be to consider the part's characteristics, support material type and color.

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