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TECH NEWS

RECENT UPDATES ON TECHNOLOGY

Prepared By S2 Students under the Guidance of DSH (Department Of Science and Humanities)

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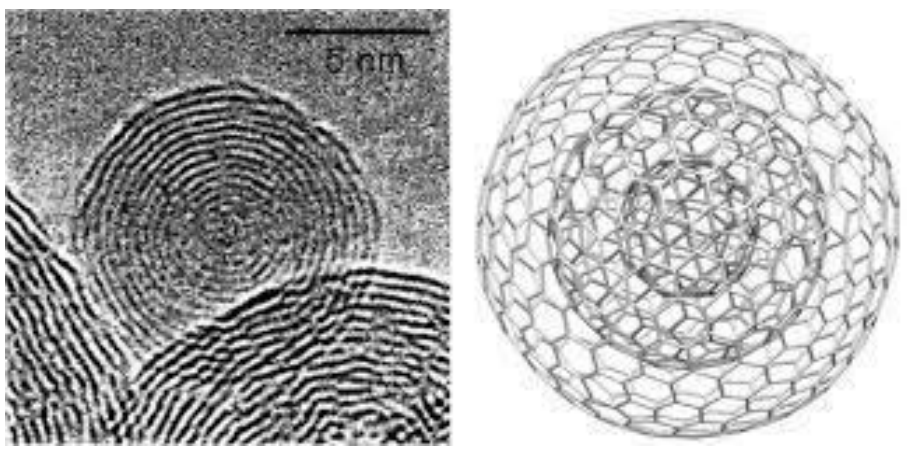
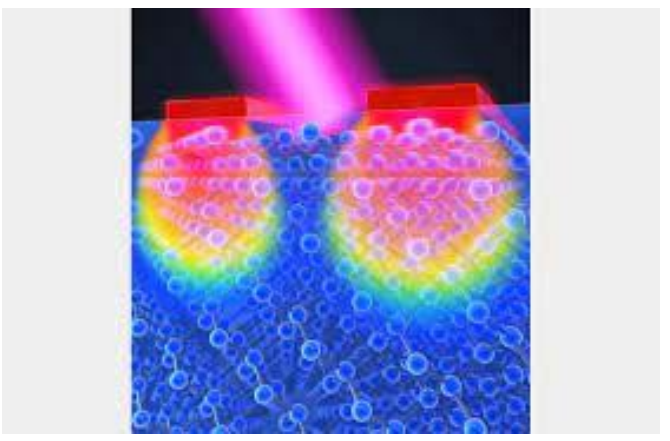
CARBON NANO-ONIONS



Cogent Nano Materials has applied the proprietary, patented Ionic Gasification technology developed by its sister company Cogent Energy Systems to produce commercial carbon nano-onions (CNOs), also known as multi-layer or multi-shell fullerenes. Cogent defines CNOs as "concentrically layered polyhedral graphitized carbon nanoparticles, generally forming a spherical shape". Cogent has demonstrated the ability to produce CNOs ranging in a size range between 20-50 nm. High concentrations of these particles within the recovered material can easily be accomplished in multi-gram quantities using simple carbon black feedstock. Cogent Nano Materials can now provide the market with a new source of carbon nano-onions in quantities previously unavailable. carbon nano onions (CNOs) have attracted considerable interest in recent years due to their unique structures and properties. CNOs, composed of multi-layered concentric graphitic shells, have large specific surface areas. These unique structures make CNOs suitable to specific applications. CNOs' good electrical conductivity and large specific surface area make them applicable as electrode materials and supercapacitors, CNOs' excellent biocompatibility makes them useful in biosensing and detection, CNOs also can be used in oxidative dehydrogenation and oxygen reduction catalytic systems, CNOs can be used to store and quickly release electrolyte ions in hydrogen storage materials, CNOs' low friction, high stability and strong mechanical properties make them useful as solid lubricants. Current methods for synthesis of CNOs have resulted in significant contaminants. Some of these methods include: Chemical vapor deposition (although this method generates contaminated particles encapsulated in carbon cages), Arc discharge between two graphite rods submerged in deionized water without metallic catalysts (this also includes a mixture of impurities, including amorphous carbon, graphite fragments, and carbon nanotubes), Thermal annealing of nano-diamonds (these too are contaminated with particles of the origination nano-diamonds),Detonation synthesis via liquid carbon condensation.

For More Details : https://cogentnano.com/

NANO-SCALE DISCOVERY COULD HELP TO COOL DOWN OVERHEATING IN ELECTRONICS



"Often, heat is a challenging consideration in designing electronics. You build a device then discover that it's heating up faster than desired," "Our goal is to understand the fundamental physics involved so we can engineer future devices to efficiently manage the flow of heat." The research began with an unexplained observation: In 2015, researchers led by physicists Margaret Murnane and Henry Kapteyn at JILA were experimenting with bars of metal that were many times thinner than the width of a human hair on a silicon base. When they heated those bars up with a laser, something strange occurred. They behaved very counterintuitively. These nano-scale heat sources do not usually dissipate heat efficiently. But if you pack them close together, they cool down much more. In the new study, they used computer-based simulations to track the passage of heat from their nano-sized bars. They discovered that when they placed the heat sources close together, the vibrations of energy they produced began to bounce off each other, scattering heat away and cooling the bars down. The transmission of heat in devices matters, the researchers added. Even minute defects in the design of electronics like computer chips can allow temperature to build up, adding wear and tear to a device. Heat flow involves very complex processes, making it hard to control. But if we can understand how phonons behave on the small scale, then we can tailor their transport, allowing us to build more efficient devices. At the atomic scale, the very nature of heat transfer emerges in a new light. They modelled a series of silicon bars, laid side by side like the slats in a train track and heated them up. When they spaced their silicon bars far enough apart, heat tended to escape away from those materials in a predictable way. The energy leaked from the bars and into the material below them, dissipating in every direction. When the bars got closer together, however, something else happened. As the heat from those sources scattered, it effectively forced that energy to flow more intensely away from the sources like a crowd of people in a stadium jostling against each other and eventually leaping out of the exit. The researchers suspect that engineers could one day tap into this unusual behaviour to gain a better handle on how heat flows in small electronics directing that energy along a desired path, instead of letting it run wild and free..

https://www.sciencedaily.com/releases/2021/08/210803121404.htm

Do You Know?

- Instagram was launched in 2010 by Kevin Systrom.
- First transatlantic radio broadcast occur in 1900 s
- The American Institute of Electrical Engineers (AIEE) founded in 1880 s decade
- Flash is a type of Electrically Erasable Programmable Read-Only Memory
- 3 to 30 MHz frequency range is the High Frequency band
- 1983 MIDI (Musical Instrument Digital Interface) introduced Antartica is covered in a sheet of ice 7000 feet thick.

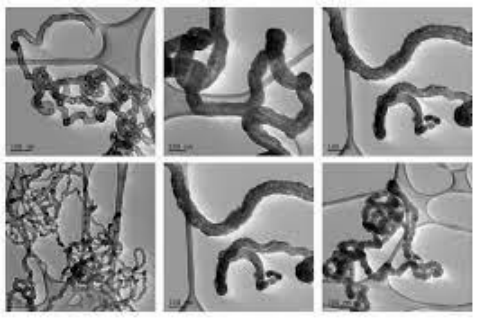
ROCKETBOOK SMART REUSABLE NOTEBOOK

This smart notebook has 32 pages that are easy to wipe clean with a damp cloth when paired with Pilot Frixion pens. The first reusable notepad of its kind, they claim it feels just like writing on a traditional pad thanks to its special space-aged paper

AMAZING FACTS:

NASA's internet speed is 91 GB per second.

FROM RECYCLING TO UPCYCLING: A SMARTER WAY OF DEALING WITH PLASTIC



Globally only about 20% of waste plastics are recycled. Boosting that figure remains a challenge as recycling plastic cleanly can be expensive and usually produces lower-value products, often making it financially unviable. The team's two-step process, revealed in the Journal of Environmental Management, converts organic waste into a carbon-rich and high value form of charcoal, then uses this as a catalyst to upcycle the plastic. "It's a smart solution for transforming both used plastic and organic waste whether tonnes of biomass from a farm or food waste and garden clippings from household green bins. The new plastic upcycling approach offers a sustainable alternative to produce carbon nanotubes (CNTs). These hollow, cylindrical structures have exceptional electronic and mechanical properties, with applications across a broad range of sectors including hydrogen storage, composite materials, electronics, fuel cells and biomedical technologies Carbon nanotubes are in growing demand, particularly in aerospace and defence, where they can facilitate the design of lightweight parts. The new method starts with converting agricultural or organic waste to biochar a carbon-rich form of charcoal often used for improving soil health. The biochar is used to eliminate toxic contaminants such as Poly-cyclic Aromatic Hydrocarbons, known as PAHs as the waste plastic is broken down into its components of gas and oil. The process eliminates those contaminants and convert plastics into high-quality liquid fuel. At the same time, the carbon in the plastic is converted into carbon nanotubes, which coat the biochar. These nanotubes can be exfoliated for use by various industries, or the nano-enhanced biochar can be used directly for environmental remediation and boosting agricultural soils. The experimental study conducted at lab scale can also be replicated in a new type of hyper-efficient reactor that has been developed and patented by RMIT. The team from RMIT's School of Engineering is keen to collaborate with plastic and waste industries to further the research and investigate other potential applications of the upcycling method.

For More Details:
https://www.sciencedaily.com/releases/2021/09/210929094218.htm

SCIENTISTS CREATE MATERIAL THAT CAN BOTH MOVE AND BLOCK HEAT

All activity generates heat because energy escapes from everything we do. But too much can wear out batteries and electronic components like parts in an aging laptop that runs too hot to sit on your lap. If you can't get rid of heat, you've got a problem. Scientists at the University of Chicago have invented a new way to funnel heat around at the microscopic level: a thermal insulator made using an innovative technique. They stack ultra-thin layers of crystalline sheets on top of each other, but rotate each layer slightly, creating a material with atoms that are aligned in one direction but not in the other. "The result is a material that is extremely good at both containing heat and moving it, albeit in different directions an unusual ability at the microscale, and one that could have very useful applications in electronics and other technology. " Normally, the materials used for devices are made up of extremely regular, repeating lattices of atoms, which makes it very easy for electricity (and heat) to move through the material. But the scientists wondered what would happen if they instead rotated each successive layer slightly as they stacked them. They measured the results and found that a microscopic wall made of this material was extremely good at preventing heat from moving between compartments. "That in itself is surprising, because it's very unusual to find that property in a material that is a dense solid those tend to be good heat conductors." But the point that was exciting for the scientists was when they measured the material's ability to transport heat along the wall and found it could do so very easily. Those two properties in combination could be very useful.

For More Details:
https://www.sciencedaily.com/releases/2021/09/210930125013.htmBy

WIND ENERGY CAN DELIVER VITAL SLASH TO GLOBAL WARMING

"Early action will reap dividends," "In terms of averting the worst of climate change, our work confirms that accelerating wind-energy technology deployment is a logical and a cost-effective part of the required strategy. Waiting longer will mean more drastic action will be needed. It published in the journal Climate. To avert environmental disaster, other greenhouse gas reduction strategies will also need to be implemented. The cost of energy from wind turbines has declined sharply. "It makes perfect sense to rapidly deploy wind energy as a key part of decarbonizing the electricity supply. The global wind energy industry has been growing. Since 2005, the total installed capacity of global wind energy shows a 14% annualized growth rate for Asia, Europe, and North America. Global wind energy electricity production expanded from 104 terawatt-hours (one trillion watts for one hour) in 2005 to 1,273 terawatt-hours in 2018, the paper said. In 2019, wind energy generated approximately 6.5% of 26,600 terawatt-hours of global electricity demand. Six countries are generating more than 20% of their demand, while the United Kingdom, Germany and Spain are close to achieving 20% of electricity demand with wind energy. China has reported about 5% of its electricity supply from wind energy. The United States generates 8.4% of its electricity from wind, as of 2020, with six states (Texas, Iowa, Oklahoma, California, Kansas, and Illinois) containing more than half of wind energy capacity, according to the U.S. Energy Information Administration. Wind turbines are now deployed in 90 countries, generating about 7% of global electricity, and the expansion of installed capacity of wind energy continues. Sectors like solar and wind have become less expensive than fossil fuels.

For More Details:
https://www.sciencedaily.com/releases/2021/09/210922143300.htm

ULTRATHIN SELF-HEALING POLYMERS CREATE NEW, SUSTAINABLE WATER-RESISTANT COATINGS

The new study found that the rapid evaporative qualities of a specialized polymer containing a network of dynamic bonds in its backbone help form a water-resistant, self-healing coating of nanoscale thicknesses. For this study, the Miljkovic group's primary focus was on boosting the efficiency of steam power plants, which are the biggest producers of electricity globally, by using these types of coatings in their condensers. "The coatings, when applied to the surfaces of the condensers, make them more water-resistant and efficient at forming water droplets, which optimizes heat transfer. When used in steam power plants, thin coatings can run into a multitude of durability problems, the researchers said. Coatings can break down in weeks, sometimes even hours. Such a short lifetime makes the real-world application of the coatings impractical, which has been a foundational challenge in mechanical and materials sciences for about eight decades. Thicker coatings can be more durable, but they reduce heat transfer and erode the associated benefit of the coating. Steam penetrates through these defects, leading to the gradual delamination of the coating, the researchers said, so their goal was to develop a pinhole-free, water-resistant thin-film and enhance the overall energy efficiency of steam power plants by several percent. "Self-healing materials can recycle and reprocess themselves,". They found that we can successfully utilize the healing enabled by the dynamic bonds, allowing the coatings to self-repair in response to scratching or to prevent pinholes from growing. Called dyn-PDMS, the material can be easily dip-coated onto materials in nanoscale layers on various surfaces like silicon, aluminium, copper or steel.

For More Details:
https://www.sciencedaily.com/releases/2021/09/210916124026.htm

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