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Ask the right questions, and nature will open the door to her secrets
- Dr. C.V. Raman, The Nobel Prize in Physics 1930

Researchers Developed New artificial Light-Harvesting System Using Organic Nanotubes

Researchers from Indian Institute of Science Education and Research (IISER) Kolkata, an autonomous Institute under the Ministry of Education, S. N. Bose National Center for Basic Sciences (SNBNCBS), Kolkata, an autonomous institute of Department of Science and Technology (DST) carried out experimental and computational investigations on artificial light-harvesting in organic nanotubes derived from the union of an organic fluorescent molecule and a therapeutically important biopolymer. Thus, researchers developed a new method of harvesting artificial light using organic nanotubes, which could be utilized in solar cells, photocatalysis, optical sensors, and tunable multi-color light-emitting materials. The future is moving towards the conversion of solar energy for storage as chemical or electrical energy, and the process of energy transfer is a key factor for such applications.

Scientists Found Novel Method to Produce Activated Carbon from Coconut Shell

Researchers from the Department of Environmental Sciences, Tamil Nadu Agricultural University, Coimbatore, studied the conversion of coconut shells to Activated Carbon (AC) using calcium carbonate as an agent. The idea was to understand its adsorption mechanism for the widely used dye, malachite green. Malachite green is used as an additive and colourant in industries such as paper, silk, and leather. AC is a processed, porous carbon version with various uses, especially in adsorption and chemical reactions for water and gas purification. The conversion of coconut shells to AC could be produced using several chemical activating agents.

IISc Bengaluru Proposed New Model for Improved Computer Numerical Control Machining

Researchers at the Centre for Product Design and Manufacturing (CPDM), Indian Institute of Science (IISc), Bengaluru, have proposed a model to make Computer Numerical Control (CNC) more efficient using Machine Learning (ML). CNC machining requires specific input parameters from human operators. NC code has to be generated from the 3D model of the product; feed rate, cutting speed, etc. are to be fed into the machine and so on, so that it produces the desired outcome. There is currently no way to accurately know which input parameters would result in which KPIs, therefore researchers suggested a Data-Driven Digital Twin (DT) framework that predicts KPIs in a CNC machining environment. ML is a branch of Artificial Intelligence (AI) and computer science which focuses on using data and algorithms to imitate how humans learn, gradually improving its accuracy.

India to Acquire its Fastest Supercomputer

Ministry of Earth Sciences announced that India would soon acquire its fastest Supercomputer, for weather monitoring mechanism with the highest resolution of probabilistic forecast that would be operational by March 2024. “The new computer could improve forecasting from 12 to 6 kms as compared to the Cray XC-40 supercomputer ‘Mihir’. with a performance of 6.8 petaFLOPS (PFLOPS), India’s fastest supercomputer at present, the new supercomputer would have nearly thrice the capability, viz 18 PFLOPS”.

Special Update: Scientists Developed New Air/Water-stable and High-Performance Cathode Materials

Researchers & Scientists at IIT Bombay in their research supported by the Science and Engineering Research Board (SERB), an attached institution of the Department of Science and Technology (DST) and DST’s Materials for Energy Storage scheme have found an avenue that could simultaneously address the air/water-instability and structural-cum-electrochemical instability of Sodium–transition-metal–oxide-based cathode materials for Sodium-ion batteries and, accordingly, have developed new air/water-stable and high-performance cathode materials. The newly developed materials exhibit high electrochemical cyclic stability and stability upon exposure to air/water, thus, facilitating the development of systems that are expected to serve as cost-effective and sustainable energy storage systems for a range of applications, including consumer electronic devices, grid energy storage, storage of energy harvested from renewables and, eventually, electric vehicles.