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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

IIT Delhi and IIT Bombay developed neural hardware with built-in memory

A research team from Indian Institute of Technology (IIT) Delhi and IIT Bombay has developed a neurological hardware with built-in memory, using magnetic materials, based on Von Neumann Architecture. The device is capable of storing data even when the power is off. It functions similar to synapses in the neurological system and is mainly based on the mechanism of the brain. This hardware device consists of an ultra-thin cobalt layer, which was fabricated using state-of-the-art facilities at IIT Delhi. The thickness of the coating is 80,000-1.00.000 times thinner compared to human hair and is in the manometer-range.

IIT Madras developed paper test-kit to instantly detect chemicals and adulterants in drinks

Researchers at Indian institute of Technology (IIT) Madras developed a simple, pocket-sized and cost-effective paper-based test that could detect chemicals and adulterating agents such as as urea, detergents, soap, starch, hydrogen peroxide and salt in milk, fruit juices and cool drinks, in a duration of 30 seconds. The test kit is a three-dimensional rectangular strip, where the top portion comprises a slot where the liquid drops could be fed. The bottom side is a palette-like structure where there are multiple slots, each one capable of changing colour and denoting the presence of a particular chemical/adulterating agent. The kit was quite sensitive and detected even small amounts of chemicals in edible liquids. The possible market roll-out date for the home-test kit will be in a year or so.

IIT Madras to develop supercapacitors from paddy waste

Researchers at the Indian Institute of Technology (IIT) Madras to develop an eco-friendly technology to upcycle paddy waste to manufacture raw materials for industrial applications. The technology would provide an additional source of income to farmers as paddy waste could be used to produce energy devices that will be used by the industry. This approach could make a key contribution to reducing stubble burning and burning of other farm waste in North India. The researchers are fostering a new 'Farm-Energy Synergy' through their work with organic waste, in-particular kitchen waste, to develop usable activated carbon, a key component in making super capacitors.

ISRO successfully conducts the RLV Autonomous Landing Mission

Indian Space Research Organisation (ISRO) successfully conducted the Reusable Launch Vehicle Autonomous Landing Mission (RLV LEX) at the Aeronautical Test Range (ATR), Chitradurga, Karnataka. In a first in the world, a winged body has been carried to an altitude of 4.5 km by a helicopter and released for carrying out an autonomous landing on a runway. RLV is essentially a space plane with a low lift to drag ratio requiring an approach at high glide angles that necessitated a landing at high velocities of 350 kmph. LEX utilized several indigenous systems. Localized Navigation systems based on pseudolite systems, instrumentation, and sensor systems, etc. were developed by ISRO. With that, ISRO successfully achieved the autonomous landing of a space vehicle.

Special Update: IISc Bengaluru developed supercapacitor for energy storage applications

Researchers at the Indian Institute of Science (IISc) Bengaluru have developed a new ultra-micro supercapacitor capable of storing massive amounts of electric charge. The device is more compact than existing supercapacitors and could potentially be used in a variety of devices, from street-lights to consumer electronics, including electric cars and medical equipment. The new supercapacitor was created using Field Effect Transistors (FETs) as charge collectors instead of the metal electrodes used in existing capacitors. To overcome the limitations of poor electron mobility in existing capacitors, the researchers created a hybrid FET by combining layers of molybdenum disulfide (MoS2) and graphene. A solid gel electrolyte was used between two FET electrons to make a super solid supercapacitor and the entire device was built on a silicon dioxde/silicon base. The new supercapicator's efficiency increased by up to 3000%, while capacitors containing only molybdenum disulfide without graphene, increased only 18% in capacity under the same conditions.