

TECHNOLOGY ROUNDUP

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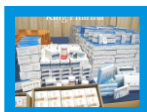
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Forthcoming Tech Events

- **Conference for Pakistan Journal of Business & Management**
- **International Conference on Business Technology and Engineering (ICBTE-2010)**
- **Industrial Exhibition (Vision 2010)**
- **World Pharma Trials Asia 2010**
- **14th International Biotechnology Symposium and Exhibition**
- **International Conference on Intelligence and Information Technology (ICIIT 2010)**

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Tech News

Renewable Energy: Inexpensive Metal catalyst can effectively generate Hydrogen from Water



Hydrogen would command a key role in future renewable energy technologies, a team of researchers with the U.S. Department of Energy (DOE), Lawrence Berkeley National Laboratory (Berkeley Lab) and the University of California, Berkeley has discovered a new proton reduction catalyst based on a molybdenum-oxo metal complex that is about 70 times cheaper than platinum (today's most widely used metal catalyst) for splitting the water molecule. In addition, this catalyst does not require organic additives, and can operate in neutral water, even if it is dirty, and can operate in sea water. These qualities make the catalyst ideal for renewable energy and sustainable chemistry.

The environmentally clean and sustainable method of producing hydrogen is electrolysis of water, using electricity to split molecules of water into hydrogen and oxygen molecules with the help of a water-splitting Metal catalyst. These metal catalysts like platinum are commercially available, but are low valence precious metals whose high costs make their widespread use prohibitive.

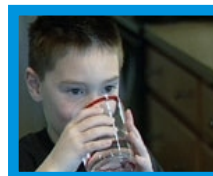
The new molybdenum-oxo metal complex is about 70 times cheaper than platinum, can operate in neutral as well as sea water without the use of additional acids or organic co-solvents with a turnover frequency of 2.4 moles of hydrogen per mole of catalyst per second. It has high valence. This metal-oxo complex represents a distinct molecular motif for reduction catalysis that has high activity and stability in water. These qualities make the catalyst ideal for renewable energy and sustainable chemistry.

Researchers are now focused on modifying the PY5Me ligand portion of the complex and investigating other metal complexes based on similar ligand platforms to further facilitate electrical charge-driven as well as light-driven catalytic processes. The emphasis is on chemistry relevant to sustainable energy cycles..

www.lbl.gov

New Software helps track the path of Toxic Spills

An inter-agency team of scientists lead by an ecological engineer Douglas Ryan have developed Incident Command (IC) Water Tool, that shows a contaminant moving through water in real time. This new software tool helps to protect the nation's drinking water from toxic contaminants. Knowing the movement of contaminants through waterways and assessing what risk they might pose to public health, the IC Water Tool could detect: Where is the contaminant going?



IC Water is a computer-based tool that integrates multiple information sources and data at the scene of a surface water contamination. Using this information, it quickly produces maps, tables and charts that tell "incident commanders" if drinking water intakes are likely to be in the contaminant's path, and, if so, when and in what concentrations that contamination will reach the intakes. The IC Water command tool is currently used by water utilities and state hazardous materials response teams in Oregon and Washington, and by the National Oceanic Atmospheric Administration (NOAA) and the Environmental Protection Agency in the Ohio Valley.

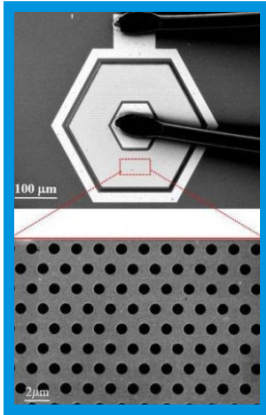
Water samples are collected weekly and analyzed, specifically for high levels of bacteria, which can cause

skin irritation, infections in the eyes, ears, and throat, or intestinal illness. The bacterial level is deemed unacceptable when there are more than 100 bacteria per 100 ml of water.

www.fraunhofer.de

Infrared Satellite Imaging Technology using Nanotechnology

Researchers from Rensselaer Polytechnic Institute TRDY, NY, USA, have developed a new nanotechnology based micro lens that uses gold to boost the strength of infrared imaging and could lead to a new generation of ultra-powerful satellite cameras and night-vision devices. By leveraging the unique properties of nanoscale gold to squeeze light into tiny holes in the surface of the device, the researchers have doubled the detectivity of a quantum dot-based infrared detector. It is expected that with some refinements new technology should be able to enhance detectivity by up to 20 times.



Infrared detection is a big priority right now, as more effective infrared satellite imaging technology holds the potential to benefit everything from homeland security to monitoring climate change and deforestation. The research is the first in more than a decade to demonstrate success in enhancing the signal of an infrared detector without also increasing the noise.

The research shows that nanoscopic gold can be used to focus the light entering an infrared detector, which in turn enhances the absorption of photons and also enhances the capacity of the embedded quantum dots to convert those photons into electrons. This kind of behavior has never been seen before.

This detectivity of an infrared photodetector is determined by how much signal it receives, divided by the noise it receives. The current state-of-the art in photodetectors is based on mercury-cadmium-telluride (MCT) technology, which has a strong signal but faces several challenges including long exposure times for low-signal imaging. This new research creates a roadmap for developing quantum dot infrared photodetectors (QDIP) that can outperform MCTs, and bridge the innovation gap that has stunted the progress of infrared technology over the past decade.

The surface plasmon QDIPs are long, flat structures with countless tiny holes on the surface. The solid surface of the structure that Lin built is covered with about 50 nanometers -- or 50 billionths of a meter of gold. Each hole is about 1.6 microns or 1.6 millionths of a meter -- in diameter, and 1 micron deep. The holes are filled with quantum dots, which are nanoscale crystals with unique optical and semiconductor properties.

The interesting properties of the QDIP's gold surface help to focus incoming light directly into the microscale holes and effectively concentrate that light in the pool of quantum dots. This concentration strengthens the interaction between the trapped light and the quantum dots, and in turn strengthens the dots' ability to convert those photons into electrons. The end result is that this device creates an electric field up to 400 percent stronger than the raw energy that enters the QDIP.

The effect is similar to what would result from covering each tiny hole on the QDIP with a lens, but without the extra weight, and minus the hassle and cost of installing and calibrating millions of microscopic lenses.

www.rpi.edu

Feel the Power: Gyms Pedal for Electricity

Gym rats can now not only build muscle power, but electric power as they pedal on fitness bikes designed to light up their own health clubs. The mechanism is simple, using dynamos on the bicycles to transfer 12 volts of electricity produced by the cyclists' pedaling to a generator which creates alternating current of 110 volts. This current helps power the gym building and reduces its bills, although not the subscriptions for members.

The system is invented by Jay Whelan, CEO of The Green Revolution, in California, America.

The commercial debut was made in 2009. It takes 20 people to create about three kilo watts in one-hour session.

In other words, with four sessions a day, the gym creates 300 kilowatts a month, which is the same as the power needed to light a typical home for half a year. Over a year, the gymnast can power the equivalent of 72 homes for one month, according to the company. Green Revolution has several dozen clients in the United States and Canada including Schools, Universities and Homeless shelters. A small gym might even be able to run its lights entirely human power.

Green Revolution employs 45 people already and is looking to expand by putting the technology into other machines, including ellipticals cross-trainers, stepping machines and recumbent bikes.

AFP



Bio-Crude turns Cheap Waste into Valuable Fuel

Scientists from CSIRO and Monash University Australia have developed a chemical process that turns green waste into stable bio-crude oil. This process will clean energy and reduce greenhouse gas emissions by improving technologies for converting waste biomass to transport fuels.



The bio-crude oil can be used to produce high value chemicals and biofuels, including both petrol and diesel replacement fuels.

By making changes to the chemical process, a concentrated bio-crude which is much more stable than that achieved elsewhere in the world. This makes it practical and economical to produce bio-crude in local areas for

transport to a central refinery, overcoming the high costs and greenhouse gas emissions otherwise involved in transporting bulky green wastes over long distances.

The process uses low value waste such as forest thinning, crop residues, waste paper and garden waste, significant amounts of which are currently dumped in landfill or burned.

The plant wastes being targeted in the process for conversion into biofuels contain chemical known as lignocellulose, which is increasingly favoured around the world as a raw material for the next generation of bio-ethanol. Lignocellulose is both renewable and potentially greenhouse gas neutral. It is predominantly found in trees and is made up of cellulose; lignin, a natural plastic; and hemicellulose.

www.csiro.au

Oxytocin drives aggression towards Competing out-groups

Researchers at the University of Amsterdam provide first-time evidence for a neurobiological cause of intergroup conflict. They show that oxytocin (commonly known as the "bonding hormone"), is a neuropeptide produced in the brain that functions as hormone and neurotransmitter, leads humans to self-sacrifice to benefit their own group and to show aggression against threatening out-groups. This finding qualifies the wide-spread belief that oxytocin promotes general trust and benevolence.



An important qualification of this research is that oxytocin functions as a cause of defensive aggression which is oriented towards neutralizing a threatening out-group. When the competing out-group was not considered a threat, oxytocin only triggered altruism towards one's own group. This finding provides a neurobiological explanation for the fact that conflicts between groups escalates when other groups are seen as threatening. When such threat is low, for example because there are (physical) barriers between the group territories, conflict escalation is less likely.

The evolution of altruism in intergroup conflict.

The researchers are wondered why oxytocin promotes altruistic behavior. Whereas classic economic theory has difficulty accounting for altruism, an evolutionary perspective suggests that altruism functions to strengthen one's own group, from which the individual benefits in the long run. Because aggression towards competing out-groups helps one's own group to become relatively stronger, aggression is an indirect form of altruistic, loyal behavior towards one's own group.

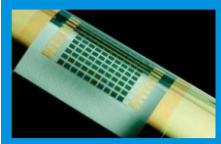
Charles Darwin already observed that groups whose members are altruistic towards the own group have a greater likelihood to prosper, to survive, and spread. The researchers reasoned that if this is true, neurobiological mechanisms should have evolved that sustain altruism towards the own group, and aggression towards competing other groups. The discovery that oxytocin promotes altruism towards the own group, and aggression towards threatening out-groups, supports this evolutionary perspective.

www.uva.nl

Semiconductor manufacturing technique holds promise for Solar Energy

Scientists at Illinois University explored lower-cost ways to manufacture thin films of gallium arsenide that also allowed versatility in the types of devices that will make the future of solar energy brighter.

Silicon is the most efficient material available for industry standard semiconductor in most electronic devices, including the photovoltaic cells that solar panels use to convert sunlight into energy. Other semiconductors like gallium arsenide and related compound semiconductors offer nearly twice the efficiency as silicon in solar devices, yet they are rarely used in utility-scale applications because of their high manufacturing cost.



Typically, gallium arsenide is deposited in a single thin layer on a small wafer. Either the desired device is made directly on the wafer, or the semiconductor-coated wafer is cut up into chips of the desired size. The Illinois group decided to deposit multiple layers of the material on a single wafer,

creating a layered, and “pancake” stack of gallium arsenide thin films. To individually peel off the layers and transfer them, these stacks have alternate layers of aluminium arsenide with the gallium arsenide. Bathing the stacks in a solution of acid and an oxidizing agent dissolves the layers of aluminium arsenide, freeing the individual thin sheets of gallium arsenide. A soft stamp-like device picks up the layers, one at a time from the top to down for transfer to another substrate like glass, plastic or silicon, depending on the application. Then the wafer can be reused for another growth.

In this way much more material can be generated more rapidly and more cost effectively.

Freeing the material from the wafer also opens the possibility of flexible, thin-film electronics made with gallium arsenide or other high-speed semiconductors. Another advantage of the multilayer technique is the release from area constraints, especially important for solar cells. As the layers are removed from the stack, they can be laid out side-by-side on another substrate to produce a much larger surface area especially for photovoltaics that require large area coverage to catch as much sunlight as possible.

By this method one really multiply the area coverage, and by a similar multiplier could reduce the cost, while at the same time eliminating the consumption of the wafer might grow enough layers to have 10 times the area of the conventional route. A shift from silicon-based panels to more efficient gallium arsenide models could make solar power a more cost-effective form of alternative energy.

<http://illinois.edu>

Sunlight with Cooling Factor

In Tunisia and Morocco, scientists are using solar energy to keep perishable foodstuffs such as milk, wine and fruit fresh.



Solar energy is already being used to power air-conditioning systems in buildings, but now researchers also want to refrigerate fruit and other perishable foodstuffs using energy from the sun. Scientists from the Fraunhofer Institute for Solar Energy Systems ISE in Freiburg have demonstrated that this is feasible in the Mediterranean region using the examples of a winery in Tunisia and a dairy in Morocco. In the MEDISCO project (Mediterranean food and agro Industry applications of Solar Cooling

technologies) solar plants for refrigerating milk and wine have been installed in cooperation with universities, energy agencies and European companies. The project is funded by the European Commission and run by the Polytechnic University of Milan.

The scientists have installed concentrating collectors which direct the sunlight onto an absorber by means of a reflector. This makes it possible to convert the solar radiation into hot water with a temperature of 200 degrees. This extreme water temperature is necessary in order to drive the absorption refrigeration machine for the high external temperatures that prevail there. Heat is used to provide refrigeration. The result is the same in both cases: refrigeration in the form of cold water or a water-glycol mixture. As the absorption refrigeration machine produces temperature, zero degrees, the experts use the mixture to prevent the water from freezing. The water-glycol solution is collected in cold accumulators and then pumped through a heat exchanger, which cools the milk. "We use a slightly different system for wine, with the refrigerant flowing through coiled pipes in the wine tanks. This method is ideal for countries which have many days of sunshine and in remote areas where there are no conventional means of refrigeration owing to a lack of water and non-existent or unreliable energy sources. It is environmentally friendly and reduces the use of expensive electricity for conventional refrigerators to a minimum. Refrigeration is always available when the sun shines, which means that it is produced at the times when demand is at its highest.

www.fraunhofer.de

Forthcoming Tech Events

Conference for Pakistan Journal of Business & Management

20-25 July, 2010

Karachi, Pakistan.

www.hamdard.edu.pk

International Conference on Bussiness Technology and Engineering (ICBTE-2010)

23-24 July, 2010

Islamabad, Pakistan.

www.iqraisb.edu.pk

Industrial Exhibition (Vision 2010)

6-8 August, 2010

Rawalpindi, Pakistan.

www.rcci.org.pk

World Pharma Trials Asia 2010

13 -16 September 2010

China

www.terrapinn.com/2010/pharmatrialscn/

14th International Biotechnology Symposium and Exhibition (IBS2010)

15 - 19 September 2010

Rimini, Italy.

www.ibs2010.org/programme.asp

International Conference on Intelligence and Information Technology (ICIIT 2010)

28-30 October, 2010

Lahore, Pakistan.

www.iciit.org

Tech & Trade Offers

Anabolic Steroids

Specification: Anabolic steroids, or anabolic-androgenic steroids, are a class of steroid hormones related to the hormone testosterone. They increase protein synthesis within cells, which results in the buildup of cellular tissue (anabolism), especially in muscles.

Anabolic steroids also have androgenic and virilizing properties, including the development and maintenance of masculine characteristics such as the growth of the vocal cords and body hair.

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Martindale Abrasion tester



Specification: Used for testing abrasion resistance of wool or blend of woven's wool, knitted and non woven fabric in specified pressure, also used for testing balling in light

pressure for most fabrics, especially for wool woven fabric. The relative moving track between sample and abrasive is figure of Lissa-jous.

Standards:

ASTM D4966, ASTM D4970, ISO 12947-1, ISO 12945-2

ISO 5470-2 BS 3424-24: 27A, TM112, TM196

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www.marstraders.com

About PASTIC

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Technology Information Section of PASTIC works exclusively for support and promotion of technological information on trade and industry in the country. "Technology Roundup" provides latest and innovative technology news, forthcoming events, etc. It also promotes products, technologies and services globally in sectors such as Agro-Industry, Bio-Technology, Building Material, Business, Chemicals, Electronics, Energy, Fisheries, Food Processing, Machinery, Packaging, Mining Pharmaceuticals and Textiles.

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