TECHNOLOGY ROUNDUP

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- 2011 International Conference on Creativity and Innovation for Sustainable Development
- Zhejiang-Alberta Life Science Forum - Human Health Risk Assessment, Food Safety, Environmental Contamination
- ITCN Asia - International Information Technology and Telecom Exhibition and Conference 2011
- 2011 International Conference on Advanced Materials Engineering (ICAME 2011)
- Green Conclave

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Tech News

Indigenous Technology

Pakistan: Perforated Hot Plate for baking Chapatti

A hot iron plate commonly known as Tawa is used to make chapatti (local bread) in nearly every house of Indian subcontinent and the countries where the natives of these countries have migrated: A chapatti, about eight inch diameter disc shaped bread, is an essential part of the meal and one person eats about 3 to 4 in one meal. If the chapatti making is made efficient then the housewife will stay less time in kitchen and gas or fuel consumption in the oven will be low. Pakistani researchers from COMSATS Institute of Information Technology have shown that a perforated hot plate bakes a chapatti in 45% less time as compared to conventional plain hot plate and thereby both energy and time economy is achieved. This perforated hot plate also acts as toaster and dispenses the expensive electric toaster which is more prone to damage. Why it bakes quicker? It is premised that when chapatti shaped dough is placed on conventional hot plate the moisture of dough in contact with the hot plate converts to steam and steam pockets emerge between dough and plate. The steam puts dents into the dough surface making it uneven. Thus, heat transfer to dough is reduced by presence of steam and also the contact area between dough and hot plate is reduced because of uneven surface of dough. The trapped steam vents through perforations in the perforated hot plate getting rid off the culprit of reduced heat transfer. From the point of view of overall energy saving in gas based ovens, it is estimated that 0.025 m^3 of gas per person per day will be saved and this would result in substantial saving in domestic consumption of gas reserves. The research result has been patented.

Source: VISB, 3rd March 2011

Frog Skin to Treat Cancer

Scientists at Queen's University, Belfast have discovered proteins in frog skins which could be used to treat cancer, diabetes, stroke and transplant patients by regulating the growth of blood vessels. Professor Chris Shaw has identified two proteins, or 'peptides', which can be used in a controlled and targeted way to regulate 'angiogenesis' (the process by which blood vessels grow in the body).

The proteins are found in secretions on the skins of the Waxy Monkey Frog and the Giant Firebellied Toad. Scientists capture the frogs and gently extract the secretions, before releasing them back in to the wild. The frogs are not harmed in any way during

this process.
Professor Shaw told that the proteins discovered have the ability to either stimulate or inhibit the growth of blood vessels. By 'switching off' angiogenesis and inhibiting blood vessel growth, a protein from the Waxy Monkey Frog has the potential to kill cancer tumours. Most cancer tumours can only grow to a certain size before they need blood vessels to grow into the tumour to supply it with vital oxygen and nutrients. Stopping the blood vessels from growing will make the tumour less likely to spread and may eventually kill it. This has the potential to transform cancer from a terminal illness into a chronic condition.
On the other hand, a protein from the Giant Firebellied Toad has been found to 'switch on' angiogenesis and stimulate blood vessel growth. This has the potential to treat an array of diseases and conditions that require blood vessels to repair quickly, such as wound healing, organ transplants, diabetic ulcers, and damage caused by strokes or heart conditions.
The aim of the work at Queen's is to unlock the potential of the natural world because the natural world holds the solutions to many of our problems. The need is to pose the right questions to find them. The discovery holds the potential to develop new treatments for more than seventy major diseases and conditions that affect more than one billion people worldwide.
http://www.alphagalileo.org

New Green Technology for Hydrogen Production

Researcher Mohamed Halabi of Eindhoven University of Technology demonstrates a proof-of-concept for a new and clean technology to produce high purity hydrogen from natural gas. This allows hydrogen to be produced in an elegant technique at much lower temperatures, and without releasing carbon dioxide into the atmosphere.
Hydrogen is a valuable feedstock for the petrochemical industry and it may play a big role in the energy supply of the future, as a green, non-polluting, and efficient energy carrier. If it is burnt, only water is formed. However, the conventional technology for hydrogen production from natural gas ('steam reforming') is a highly energy intensive process, operated at high pressures (up to 25 bar) and high temperature (850 degrees C), with multistage subsequent separation and purification units. Moreover, huge amounts of CO_2 have to be handled in post-processing steps.
TU Eindhoven has now developed a new and improved technology called sorption enhanced catalytic reforming of methane," using novel catalyst/sorbent materials. Halabi, working in collaboration with the Energy Research Centre of the Netherlands (ECN), has demonstrated the feasibility of producing hydrogen through such a process at much lower temperatures (400 to 500 degrees Celsius).
The process is performed in a packed bed reactor using a Rhodium-based catalyst and a Hydrotalcite-based sorbent as a new system of materials. Hydrogen is produced on the active catalyst and the cogenerated CO_2 is effectively adsorbed on the sorbent, hence preventing any

CO_2 emissions to the atmosphere.
Direct production of high purity hydrogen and fuel conversion greater than 99.5% is experimentally achieved at low temperature range of (400 -- 500 ºC) and at a pressure of 4.5 bar with a low level of carbon oxides impurities: less than 100 ppm." The enormous reduction of the reactor size, material loading, catalyst/sorbent ratio, and energy requirements are beneficial key factors for the success of the concept over the conventional technologies. Small size hydrogen generation plants for residential or industrial application operated at a relatively low pressure, of less than 4.5 bar, seem to be feasible.
http://www.tue.nl

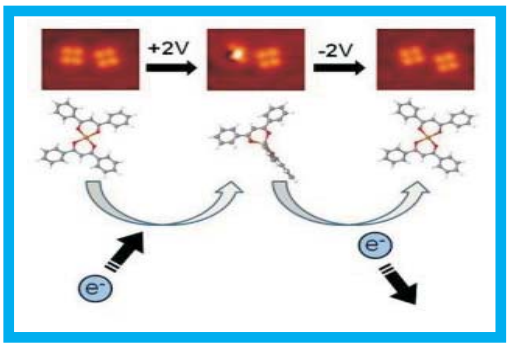
Novel Geothermal Technology Packs a One-Two Punch against Climate Change

Researchers from Department of Earth Sciences, University of Minnesota have developed an innovative approach to tapping heat beneath Earth's surface. The method is expected to not only produce renewable electricity far more efficiently than conventional geothermal systems, but also help reduce atmospheric carbon dioxide (CO2) dealing a one-two punch against climate change.
Established methods for transforming Earth's heat into electricity involve extracting hot water from rock formations several hundred feet from Earth's surface at the few natural hot spots around the world, then using the hot water to turn power-producing turbines. The CPG system uses high-pressure CO2 instead of water as the underground heat-carrying fluid.
CPG provides a number of advantages over other geothermal systems. First, CO2 travels more easily than water through porous rock, so it can extract heat more readily. As a result, CPG can be used in regions where conventional geothermal electricity production would not make sense from a technical or economic standpoint.
This is probably viable in areas one could not even think about doing regular geothermal for electricity production. In areas where one could, it is perhaps twice as efficient.
CPG also offers the benefit of preventing CO2 from reaching the atmosphere by sequestering it deep underground, where it cannot contribute to climate change. In addition, because pure CO2 is less likely than water to dissolve the material around it, CPG reduces the risk of a geothermal system not being able to operate for long times due to "short-circuiting" or plugging the flow of fluid through the hot rocks. Moreover, the technology could be used in parallel to boost fossil fuel production by pushing natural gas or oil from partially depleted reservoirs as CO2 is injected
http://www.umn.edu/twincities/index.html

A Molecule that Switches On and Off

Researchers in France have developed a single molecule whose charge state and shape can be changed at will. The advances, made at the CEMES, Centre for Materials Elaboration and Structural Studies, (CNRS), may prove a key advantage in the race for miniaturization. In addition to controlling its charge in a completely reversible way, the researchers have revealed a link between the molecule's charge and its geometrical shape, effectively making it usable as a bit of

information or an electromechanical system on a nanometric scale. This perfectly controllable back-and-forth motion at the molecular level holds great promise for the creation of ultra-dense digital memory or nanomotors.



It is called a molecular switch: a molecule that can interchangeably adopt state A or state B under the influence of an external stimulus. In this specific experiment, the two states correspond to different molecular geometries: the composition remains the same but the shape changes. To induce the change, an electron must be added to the molecule, which constitutes the external stimulus. Adding an electron also introduces an additional repelling force, causing certain atoms to pull further away from each other and changing the molecule's shape from a flat, square configuration to a more voluminous pyramidal configuration.

From a technical point of view, the operation is made possible by the use of a scanning tunneling microscope (STM). The STM serves both as a camera to reveal the molecule's shape and as a tool for injecting electrons: when the microscope's tip applies an electrical tension, the molecule gains an electron and changes shape, becoming pyramidal. The process is completely reversible: when a reverse voltage is applied, the molecule releases the electron and recovers a flat shape and neutral charge. The CNRS researchers have measured the molecule's charge state in both configurations using an atomic force microscope (AFM), thus establishing the close link between the molecule's charge and its geometrical shape.

This switch opens the way to numerous applications, including the synthesis of elementary memory units on a molecular scale. The molecule's capacity to hold a charge and release it on demand could be used to encode binary information. In addition to applications in molecular electronics, it would be possible to use the molecule's geometrical transformation to produce a nanomachine.

http://www.cnrs.fr

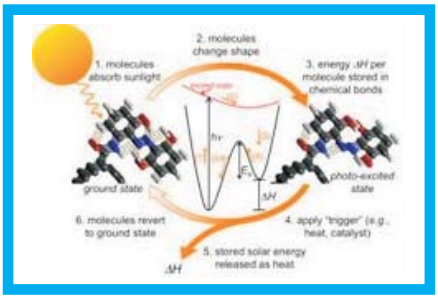
Biological Engineers Generate Natural Gas with Bacteria

Biological Engineer Ruihong Zhang and her students at UC Davis in California are turning garbage into bio-gas that may provide the electricity in one's home. Trash could soon be powering our's home A new kind of waste digester uses two different strains of bacteria in different tanks. This would normally take place in the same environment, but microbiologists have now separated it into two stages that increase natural-gas production. This process takes the two bacteria and separates them into two separate environments.

In the process, food waste is collected from restaurants and institutions and then fed to bacteria that thrive in low-oxygen environments. It is called anaerobic digestion, a naturally

occurring process of decomposition. One type of bacteria turns carbohydrates into simple sugars, amino acids and fatty acids. A second group of bacteria eats those compounds and turns them into hydrogen gas, carbon dioxide, and acetic acid the primary component of vinegar. Then a third group of bacteria takes those broken-down compounds and turns them into methane and carbon dioxide. Between 60 and 80 percent becomes methane. The methane can be used as fuel for an internal combustion engine that provides electricity.
Anaerobic digestion is not the same thing as human digestion, since the type of bacteria that produce methane do not live in the human digestive tract. Industrial anaerobic digesters can also harness this natural process to treat waste, provide heat, and increase nutrients in soil. They are most commonly used for sewage treatment and for managing animal waste
The technology will turn three tons of food scraps into energy for 25 houses a day. But it is not just for homes. The digester could be especially useful to fuel processing plants.
http://www.ieeeusa.org

Carbon Nanotubes can Store Solar Energy



A novel application of carbon nanotubes, developed by MIT researchers, shows promise as an innovative approach to storing solar energy for use whenever it is needed.
Storing the sun's heat in chemical form rather than converting it to electricity or storing the heat itself in a heavily insulated container has significant advantages, since in principle the chemical material can be stored for long periods of time without losing any of its stored energy.
Jeffrey Grossman and four co-authors figured out exactly how fulvalene diruthenium is the best chemical for reversibly storing solar energy.
The new material found by Grossman and Kolpak is made using carbon nanotubes, tiny tubular structures of pure carbon, in combination with a compound called azobenzene. The resulting molecules, produced using nanoscale templates to shape and constrain their physical structure, gain new properties that are not available in the separate materials.
Not only is this new chemical system less expensive than the earlier ruthenium-containing compound, but it also is vastly more efficient at storing energy in a given amount of space about 10,000 times higher in volumetric energy density. By using nanofabrication methods, the molecules interactions can be controlled increasing the amount of energy they can store and the length of time for which they can store it and most importantly, both can be controlled independently.
Thermo-chemical storage of solar energy uses a molecule whose structure changes when exposed to sunlight, and can remain stable in that form indefinitely. Then, when nudged by a stimulus a catalyst, a small temperature change, a flash of light it can quickly snap back to its other form, releasing its stored energy in a burst of heat. Grossman describes it as creating a rechargeable heat battery with a long shelf life, like a conventional battery
www.sciencedaily.com

Forthcoming Tech Events

10th International Conference on Sustainable Energy Technologies

4-7 September, 2011
Istanbul, Turkey
www.set2011.org

2011 International Conference on Creativity and Innovation for Sustainable Development

12-14 September, 2011
Kuala Lumpur, Malaysia
www3.iium.edu.my/irkhs/icci

Zhejiang-Alberta Life Science Forum - Human Health Risk Assessment, Food Safety, Environmental Contamination

19-21 September, 2011
Hangzhou, Zhejiang, China
http://zj-ablifesci.net/

ITCN Asia - International Information Technology & Telecom Exhibition and Conference 2011

20-22 September, 2011
Karachi,Pakistan
www.itcnasia.com

2011 International Conference on Advanced Materials Engineering (ICAME 2011)

1-3 Octobe,r 2011
Cairo, Egypt
www.icame.org/cfp.htm

Green Conclave

13-14 October, 2011
New Delhi, India
www.greenconclave.in

Tech & Trade Offers

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