

## Indian Industry News



### Chemical Hub at Haldia Planned

Haldia, a port town in eastern India, is all geared up to become a major hub for chemical industries. The West Bengal Industrial Development Corporation Ltd. (WBIDC) and the Indian Oil Corporation (IOC) have signed an agreement for setting up a chemical hub at the proposed Special Economic Zone in Haldia. Plans are afoot to set up a 15-million tonne 'grassroots' refinery and a number of other integrated downstream units, such as, polyester, polymer, benzene and paraxylene units. The hub is expected to be completed by 2012.

Meanwhile, NextGen Fuel, a US-based company, has proposed to set up a greenfield refinery at Haldia that will comprise a bio-ethanol plant, a bio-diesel plant, a plastic recycling unit and a co-generation power unit. The bio-ethanol plant, proposed by NextGen, will use sweet corn, sorghum and rice as its main raw material. The plant will be constructed with an annual production capacity of 100 million gallons. The bio-diesel plant will have a daily production capacity of 500 tonnes. The plastic recycling unit will have a daily production capacity of 100 tonnes.

*The Statesman*, 1 October 2006

### Orissa MoUs with 10 Power Giants

Orissa, a south-eastern state of India, is set to become power house of the country with various companies signing MoUs for setting up 10 thermal power plants in the state. The companies, namely, Tata Power Company, Visa Power, Monnet Ispat and Energy, Lanco Group, KVK Nilachal Power, CESC Ltd., Essar Power, Jindal Photo, Bhusan Energy, and, Sterlite Energy Pvt. Ltd., will set up power plants to produce 10,920 MW of power.

*The Hindu*, 27 September 2006

### NTPC to Triple Generation Capacity

NTPC plans to triple its generation capacity to 75,000 MW by 2017 while venturing into hydroelectric power projects, coal mining and nuclear plants. NTPC will add a capacity of about

21,941 MW during the 11th Plan (2007-12), according to Mr T. Sankarlingam, CMD, NTPC. The power giant will commence coal production from one of the eight mines that have been allocated to it.

*The Hindu*, 21 September 2006

### Wind Power from ONGC, Essar by 2007

ONGC is going ahead with its plans to produce 100 MW of electricity from wind generators in Gujarat and Andhra Pradesh to power continuous pumping operations in its oilfields in these two states. Rs 500 crore (over \$ 10 million) is being invested into two wind farms, each with a capacity of 50 MW. The farms will be set up in coastal areas. The units are expected to be ready by early 2007.

Meanwhile, the Essar Group is also foraying into the wind energy segment in a big way. It has tied up with the German company, Repower Systems, to produce electricity as well as equipment for wind farms. The company has identified Hazira and Bhuj in Gujarat as two possible locations for its manufacturing facility. The company expects to start commercial production by the middle of next year.

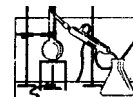
*The Times of India*, 4 September 2006, 18 September 2006

### Oil Majors' Pact with Authentrix for Marker

Indian oil majors, namely, Indian Oil, Bharat Petroleum and Hindustan Petroleum, have tied up with the UK-based Authentrix to introduce a patented marker in kerosene so as to check its rampant use in diesel for adulterating it. Authentrix has used nano-technology to develop its markers. If the kerosene is mixed with diesel, the marker will change the colour of the mixture, indicating adulteration. According to the National Council of Applied Economic Research, as much as 38.6 per cent of kerosene meant for PDS (public distribution system) is used in adulteration.

*The Telegraph*, 17 July 2006

Compiled by Nandini Roy



### Advanced Nano-lithography Developed

Scientists at Northwestern University, USA, have developed Dip-Pen Nano-lithography (DPN), an advanced patterning method, that allows simultaneous creation of 55,000 identical patterns drawn with tiny dots of molecular ink. Each two-dimensional array drawn on substrates of gold or glass is a single molecule tall. To demonstrate the technique, researchers reproduced the face of Thomas Jefferson from a 5-cent coin 55,000 times within 30 minutes. Each identical image was 12 micrometers wide — about twice the diameter of a red blood cell — consisting of 8,773 dots, each 80 nanometers in diameter.

According to Prof. Chad Mirkin, Director of Northwestern's International Institute for Nanotechnology, the advantage of DPN, a maskless lithography, is, it can be used to deliver many different types of inks simultaneously to a surface in any configuration one desires. "This development should lead to massively miniaturized gene chips, combinatorial libraries for screening pharmaceutically active materials and new ways of fabricating and integrating nano-scale or even molecular-scale components for electronics and computers," he said.

*Science Daily*, 26 September 2006

### Second DNA Code Discovered

Dr Jonathan Widom of Northwestern University, Illinois, US and Dr Eran Segal of Weizmann Institute, Israel, together have reported discovering a second DNA code that sets the placement of the nucleosomes around which DNA is looped. The new code they have discovered is in addition to DNA's genetic code, which specifies all the proteins a cell makes, according to *New York Times*. Nucleosomes — tiny protein spools — control access to the DNA itself. According to the teams, the discovery, if confirmed, could open new insights into the higher order control of the genes, such as the process by which each human cell is allowed to activate the genes it needs, but cannot access the genes used by other types of cell.

*Nature*, July 2006

### 'Net' to Trap Living Cells

Researchers at Lund University, Sweden have developed tiny plastic imprints and mimics of biological molecules that are poised to speed drug discovery, warn of bio-terror attacks and remove toxins from the environment, among other applications. Prof. Klaus Mosbach of Lund University, with his students and a team of scientists, have developed 'fishing nets' of sorts that work at the nanometer scale. The nets could trap living cells, and, later, smaller biological entities, such as, enzymes or other molecules. The technology has proven to be attractive for dozens of applications. For instance, plastic nets containing *Escheria coli* cells are used today to produce aspartic acid, an amino acid used in the preparation of various medicines. In the food industry, plastic embedded with a specific enzyme converts the sugar glucose into fructose, which is much sweeter. A different net-and-enzyme combination has even helped to fabricate the precursors of the plastic material that makes up the nets. Notably, cells held in the nets might replace ones that have died or malfunctioned.

*Scientific American*, October 2006

### Scientists Revise Phase Diagram of Water

A new computational model constructed by the US Department of Energy's Sandia National Laboratories has reportedly expanded the known range of water's electrical conductivity. The theoretical work, carried out by Thomas Mattsson and Mike Desjarlais, showed phase boundaries for 'metallic water'. According to the study, water with its electrons able to migrate like a metal's electrons, should be lowered from 7,000 to 4,000 kelvin and from 250 to 100 gigapascals. Such a lowered boundary is expected to revise astronomers' calculations of the strength of the magnetic cores of gas-giant planets such as Neptune. Because the planet's temperatures and pressures lie partly in the revised sector, its electrically conducting water probably contributes to its magnetic field, formerly thought to be generated only by the planet's core. The calculations are also said to agree with experimental measurements in research led by Peter Celliers of Lawrence Livermore National Laboratory.

*Science Daily*, 4 October 2006

### Low Humidity Fuel Cell Membrane Developed

Professor James McGrath, Department of Chemistry, Virginia Tech McGrath, and his team of researchers have developed a proton exchange membrane (PEM) material that retains conductivity even in low humidity settings. Fuel cells convert chemical energy, usually from hydrogen, to electrical energy. In a PEM fuel cell, it occurs through a thin water-swollen copolymer film containing sulfonic acid groups. Electrons are peeled off by oxidation of the hydrogen atoms and hydrated protons pass through the film to combine with oxygen on the other side to form water as a byproduct. But the efficiency of the process depends upon water. As a result, efficiency, measured as proton conductivity, goes down as humidity decreases. Prof McGrath and his team have demonstrated a method for creating a material with improved conductivity even at low humidity.

*Science Daily*, 11 September 2006

### Nanotubes Made Magnetic

Engineers often combine two or more materials to make a composite with superior properties, such as, the strength and lightness achieved by setting carbon fibres in an epoxy resin. However, it is difficult to combine materials at nanoscale due to lack of enough composite materials. Chemical engineers in China have worked out a simple way to add a prime engineering property – the magnetism of iron particles – to carbon nanotubes. Nanotubes have unique electrical, optical and mechanical properties that lend themselves to all sorts of nano-engineering applications. As they are hollow, they can also be used to transport catalysts or drugs. However, till now, magnetically guiding nanotubes containing drugs was difficult as the tubes were magnetically very weak. With this innovation, such problems have been solved.

*New Scientist*, 11 September 2006

### New Polymers Created

Prof. Timothy Long at Virginia Tech, USA along with his student Brian Mather is reported to have created new polymers by adding DNA base pairs,

including self-healing polymer films and coatings. Base pairs are nucleotides on each side of the rungs that connect the strands of the DNA ladder. According to Mr Mather, adenine and thymine have been attached as the outer sequences of triblock copolymers – polymers in which the units of a molecular chain are connected in blocks of the same structure rather than randomly mixed. Prof. Long said, they are trying to integrate molecular biology with traditional macromolecular science in order to synthesize novel families of elastomers. The base pairs disassociate when heated and permit the polymer to easily flow in the melt state, making it easier to process with less energy. When the triblock copolymer cools, the pairs reconnect and provide desirable elasticity and molecular recognition possibilities.

*Science Daily*, 12 September 2006

### Catalyst that Removes Perchlorate from Water

John Shapley, a professor of Chemistry at the University of Illinois-Champaign, along with his student, Keith Hurley, has developed a chemical catalyst that uses hydrogen to remove and destroy perchlorate from contaminated groundwater. Perchlorate, found in solid-rocket fuel, roadside flares and fireworks, can disrupt thyroid function by interfering with iodine uptake. It has been recognized as a significant environmental contaminant in the US water supplies and its physical and chemical properties pose a serious challenge for remediation, according to Prof. Shapley. Efforts at remediation using naturally occurring micro-organisms or pump-and-treat technology are too complicated, too energy intensive or too slow to be practical. The new catalyst is composed of two metals – palladium and rhenium – supported on activated carbon. “In catalytic operation, the rhenium removes an oxygen atom from the perchlorate molecule in what is called an atom transfer reaction. Meanwhile, the palladium activates the gaseous hydrogen atoms so they will react with the freed oxygen. What’s left is harmless chloride and water,” Mr Hurley said.

*Science Daily*, 11 September 2006

Compiled by Nandini Roy



### **Global Warming Nears a Million-year High**

The Earth's rapid warming has pushed temperatures to their hottest level in nearly 12,000 years and a hair's breadth away from a million-year peak, according to a NASA study. Global warming, which has increased temperatures by 0.2°C per decade over the past 30 years, has caused temperatures to reach and now pass through the warmest levels in the current interglacial period, which lasted almost 12,000 years. The study, led by James Hansen and his colleagues at NASA's Goddard Institute for Space Studies, reports that Earth is now within about 1°C of the maximum estimated temperature of the past million years. That means that further global warming of 1.0°C defines a critical level. If warming is kept less than that, effects of global warming may be relatively manageable.

"During the warmest interglacial periods, the Earth was reasonably similar to today. But if further global warming reaches 2°C or 3°C, we will likely see changes that make Earth a different planet than the one we know", according to Mr Hansen.

*New Scientist*, 26 September 2006

### **Radiation Hazards from CFLs**

Excessive radiation of ultraviolet rays from Compact Fluorescent Lamps (CFLs) could cause multiple hazards for the eyes and the body, according to scientists at the eastern unit of Electronics Regional Test Laboratory (ERTL). Following a thorough test conducted for about a year, it has been found that UV radiation from CFL lamps is at least 10 times higher than ordinary tube lights. Floodlights are even more harmful as the quantum of radiation is higher. UV ray damages eyesight as optical nerves dry up under its exposure. It increases the possibility of cataract as well. Moreover, it may even cause skin cancer, according to one of the ERTL scientists. However, if a cover made of polyethylene terephthalate (PET) is used in CFLs, at least 90 per cent of the UV ray radiation can be reduced. Also, at least a distance of 5 feet has to be maintained from the light source, the scientists have suggested.

*The Telegraph*, 13 September 2006.

### **'Several GM Crops in Pipeline'**

Notwithstanding campaigns against genetically modified (GM) foods and crops, several transgenic crops are in the pipeline in India, according to the Union Agriculture Minister, Mr Sharad Pawar. The list includes, bollworm-resistant pigeon pea, BT brinjal, tomato resistant to leaf curl virus, tomato with delayed ripening as well as improved shelf life, and, potato with enhanced levels of essential amino acids. BT cotton is already in circulation. Speaking at a recent conference on agriculture biotechnology, Mr Pawar said, biotechnology offered a tremendous potential to tackle the issue of food security and nutritional security. However, adding a note of caution, Mr Pawar said, food safety and environmental risk assessment should be carried out on GM crops on a strict scientific basis.

*The Hindu*, 1 October 2006

### **Microbial Cleaners to Remove Toxic Wastes**

A team of researchers from the Microbiology Department of West Bengal University of Technology, while mapping the microbial population of the East Calcutta Wetlands (ECW), has isolated 22 easy-to-culture strains. The strains can help clean up toxic soil and water. The bacteria can also help remove metals such as chromium and lead. Moreover, some of the strains can degrade oils like petrol, diesel and burnt engine oil, thereby, cleaning up oil spills. Nine of the 22 strains can degrade oils, while another nine secrete extra-cellular protease, an enzyme that can be used in pharmaceutical and soap industries. Of them, one is a secondary protease, that, when added to detergents, helps remove tough grease and oil stains. Another strain helps 'de-hairing' of hides and might be useful in the leather tanning industry.

The ECW comprises several waterbodies spread across over 5,000 hectares, which treat Calcutta's sewage. The ecosystem in the wetlands uses the refuse in fisheries and agriculture. In the process, it purifies it to a standard that is equal to many urban secondary-level treatment plants.

(8<sup>th</sup> Day), *The Statesman*, 1 October 2006

### **CFC Reduction: India Achieves 50% of Target**

India has achieved a 50 per cent reduction target of chlorofluorocarbons (CFCs) production from 22,558 metric tonnes to 11,294 metric tonnes and consumption from 6,681 metric tonnes to 1,940 metric tonnes, according to Mr Namo Narain Meena, the Union Minister of State for Environment and Forest. The most critical and important target of production and consumption of another ozone depleting substance used as a cleaning and process agent – Carbon Tetra Chloride (CTC) – has also been achieved by adopting suitable alternative technology, Mr Meena said at a recent function. India has so far received about Rs 1,000 crore to phase out 23, 000 metric tonnes of production of CFC and CTC as well as 22,000 metric tonnes consumption of CFC, CTC, Halon and methyl chloroform.

*The Hindu*, 18 September 2006

### **Eco Hazards Cause One-third of Deaths: WHO**

The World Health Organisation (WHO) has published a report recently, according to which, almost a quarter of global diseases are caused by avoidable environmental factors, which takes a toll of 13 million lives annually. Such hazards include polluted water, unsafe fuel, rickety buildings, dangerous traffic, etc, which are responsible for one-third of deaths in developing countries. Prevention of environmental risk could save as many as four

million lives annually, particularly in the developing countries.

*The Times of India*, 17 June 2006

### **PVC Toys Hazardous: Toxic Link**

Following a detailed study in Delhi, Mumbai and Chennai on the impact of toys on children, Toxic Link, the environmental study group, has warned that chewing or sucking of rubber toys made of PVC (polyvinyl chloride) could cause long term health problems. According to the report, high levels of lead and cadmium in PVC toys can cause itching and allergies, and, if the exposure is sustained, it can damage liver, kidneys, and can cause memory loss. Most of the toys, picked up at these metros, were of Chinese origin. According to the study, Delhi and Mumbai alone make for 95 per cent of the trade in toys, contaminated with lead and cadmium.

Incidentally, all these toys are unbranded. Nothing is known as yet about unbranded toys.

Out of the 30 samples analysed for total concentration of lead and cadmium in toys from Mumbai, eight samples showed concentration higher than 220 ppm, which is the limit proposed by Consumer Product Safety Commission in vinyl blinds. As many as five samples showed very high lead concentration, exceeding even the US Environmental Protection Agency limit of 600 ppm in painted toys.

*The Times of India*, 20 September 2006

Compiled by Nandini Roy

## **National Seminar on Challenges in Fuel Cell Technology: India's Perspective**

December 1 and 2, 2006

**Venue :** Indian Institute of Technology, Delhi

**Sponsored by :** Department of Science and Technology, Government of India

*Organised by*

Dr. S. Basu (Convener)

Department of Chemical Engineering

Indian Institute of Technology, Delhi

New Delhi 110 016

(For details contact : [fc\\_seminar@yahoo.co.in](mailto:fc_seminar@yahoo.co.in); <http://www.iitd.ac.in/events/conf.html>)

## Coming Events

- **Workshop & Training Programme on Computational Fluid Dynamics**  
**Date:** 11 – 15 December 2006  
**Venue:** Pune  
**Organiser:** Centre for Development of Advanced Computing, Pune  
**Contact:** Sudha Suresh / Aashok Kumar C-DAC, Pune  
**Tel:** +91 020-2570 4180  
**E-mail:** cfd2006@cdac.in  
**Website:** www.GLS8.com
- **8<sup>th</sup> International Conference on Gas-Liquid and Gas-Liquid-Solid Reactor Engineering**  
**Date:** 16 – 19 December 2006  
**Venue:** New Delhi  
**Organiser:** Dept. of Chemical Engineering IIT, Delhi  
**Contact:** Prof K D P Nigam  
Dept. of Chemical Engineering  
IIT, New Delhi 110 016  
**Tel:** +91 011-265 91020  
**E-mail:** gls8.kdpm@gmail.com  
**Website:** www.GLS8.com
- **ICCTEM'07**  
International Conference on Cleaner Technologies and Environmental Management  
**Date:** 4 – 6 January 2007  
**Venue:** Pondicherry  
**Organiser:** Pondicherry Engineering College; Pondicherry Regional Centre, IICChE; Indian Environmental Association  
**Contact:** Dr S Sundaramoorthy  
Pondicherry Engineering College  
**Tel:** +91 413 2655 281 (Extn. 581)  
**E-mail:** ssm\_pec@yahoo.com  
**Website:** www.pec.edu
- **ENVICON 2007**  
National Seminar on Environmental Concern and Remedies in Alumina Industry  
**Date:** 27, 28 January 2007  
**Venue:** Damanjodi, Orissa  
**Organiser:** Damanjodi Regional Centre, IICChE  
**Contact:** Mr B N Mohanty  
Chairman, ENVICON  
**Tel:** 254239 (O), 254332 (R)  
**E-mail:** bnmohanty@nalcindia.co.in
- **MB 2007**  
Seminar on Mineral Biotechnology  
**Date:** 30, 31 January 2007  
**Venue:** Bhubaneswar  
**Contact:** Mr K Srinivasa Rao  
RRL, Bhubaneswar 751 013  
**Tel:** 0674 2581 1635 (Extn. 467)  
**E-mail:** ksrao@rrlbhu.res.in
- **Water Treatment and Reuse II**  
**Date:** 11 – 16 February 2007  
**Venue:** Tomar, Portugal  
**Organiser:** Engineering Conferences International, 6 Metro Tech Center, New York 11201  
**Tel:** 1-718-260-3743  
**Fax:** 1-718-260-3754  
**E-mail:** info@eci.poly.edu
- **PETROSAFE 2007**  
Conference on Hydrocarbon Safety  
**Date:** 23 – 25 April 2007  
**Venue:** Kochi  
**Organiser:** National Safety Council, Kerala Chapter & Petroleum & Explosive Safety Organisation, Govt. of India  
**Contact:** Mr R Venugopal  
**Tel:** +91 484 2422 7296 / 86  
**E-mail:** rvg@petrosafe2007.com  
**Website:** www.petrosafe2007.com
- **The 12<sup>th</sup> International Conference on Fluidization: New Horizons in Fluidization Engineering**  
**Date:** 13 – 17 May 2007  
**Venue:** Vancouver, Canada  
**Organiser:** Engineering Conferences International, 6 Metro Tech Center, New York 11201  
**Tel:** 1-718-260-3743  
**Fax:** 1-718-260-3754  
**E-mail:** info@eci.poly.edu
- **ICP2007**  
International Conference on Photochemistry  
**Date:** 29 July – 3 August 2007  
**Venue:** Cologne, Germany  
**Organiser:** University of Cologne, Germany and the German Chemical Society  
**E-mail:** info@icp2007.net