

TECHNOLOGY ROUNDUP

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- **5th Power Generation Conference & Exhibition, 2012**
- **International Trade & Industrial Machinery Show**
- **2nd International Conference on Energy, Environment & Sustainable Development**
- **Materials Challenges in Alternative and Renewable Energy**
- **MEGATECH Pakistan 2012**
- **The 2nd International Conference on Information Science and Technology**
- **8th International Conference and Exhibition on Ceramic Interconnect and Ceramic Microsystems Technologies 2012**

Tech News

Indigenous Technology

Solar Still Technology for Potable Safe Water in Rural Areas

Supply of fresh and clean drinking water is a basic need for all human beings. Many people throughout the world do not have access to clean water and the problem of availability of adequate supplies of safe drinking water is worsened with increase in human population.

The presence of high level of salts in water is a great threat to human life. About eighty percent of all illnesses in the developing world results from waterborne diseases. Since majority of people live in rural areas where the low population density and remote locations make it very difficult to install the traditional clean water solutions. Due to high cost to treat contaminated water by the current technological processes it is not considered suitable to utilize these technologies. The locally developed solar still technology could provide one of the possible solutions to this problem. A research was conducted to develop a cheaper solar still which could be easily fabricated with less technical expertise. The effectiveness of sand bed as base energy absorbing surface to evaporate brackish water was studied and its performance was compared with those obtained from conventional basin type solar still.

Scientists at Mechanical Engineering Department of Quaid-e-Awam University of Engineering, Science & Technology, Shaheed Banazirabad, Nawabshah carried out a research to determine effectiveness of common sand bed for desalination of brackish water. A locally manufactured basin type solar still having equal angled double slope covers with an effective area of 1.5m^2 using common sand as solar energy absorber medium was used. Various samples of water with different degree of hardness were collected from the different areas in the vicinity of QUEST (Quaid-e-Awam University of Engineering, Science & Technology, Shaheed Banazirabad, Nawabshah). The system under study showed good performance in terms of quality of water. It was observed that concentration of salts was reduced at remarkable level. The chemical analysis of the desalinated water showed significant reduction in TDS and pH values. The present set-up showed identical performance as compared to the conventional basin type solar still.

Sand bed system provides cheaper system for application in rural areas for getting potable water. Solar still could be an attractive option to overcome potable water shortage problems in remote areas. An optimum brine depth of 20mm was determined for maximum water production in the solar still. Maintenance, energy costs, reliability, water quality are the advantages of solar distillation system. Hike in energy prices and scarcity of fresh water seem bound to create early market for small manufactured solar water distilling units. Although the input of one still is not sufficient for daily requirement of average family comprising of four members, it could be enhanced by increasing surface area of the solar still.

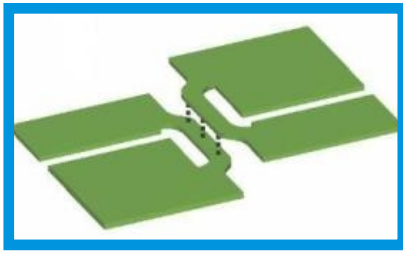
Courtesy:

Prof. Dr. Abdul Hameed Memon
Dean Faculty of Engineering

Quaid-e-Awan University of Engineering Sciences & Technology, Shaheed Banazirabad,
Nawabshah, Sindh, Pakistan

E-mail:dr ahameed_memon@hotmail.com

World's Smallest Electronic Circuit



A team of scientists, led by Guillaume Gervais from McGill's Physics Department and Mike Lilly from Sandia National Laboratories, has engineered one of the world's smallest electronic circuits. It is formed by two wires separated by only about 150 atoms or 15 nanometers (nm).

The discovery could have a significant effect on the speed and power of the ever smaller integrated circuits of the future in everything from smartphones to desktop computers, televisions and GPS systems.

This is the first time that anyone has studied how the wires in an electronic circuit interact with one another when packed so tightly together. The effect of one wire on the other can be either positive or negative. This means that a current in one wire can produce a current in the other one that is either in the same or the opposite direction. This discovery, based on the principles of quantum physics, suggests a need to revise our understanding of how even the simplest electronic circuits behave at the nanoscale.

In addition to the effect on the speed and efficiency of future electronic circuits, this discovery could also help to solve one of the major challenges facing future computer design. This is managing the ever-increasing amount of heat produced by integrated circuits.

Well-known theorist Markus Büttiker speculates that it may be possible to harness the energy lost as heat in one wire by using other wires nearby. Moreover, Büttiker believes that these findings will have an impact on the future of both fundamental and applied research in nanoelectronics.

<http://www.mcgill.ca/>

Detection of Breast Cancer through Nanoprobes and SQUID

Mammography saves lives by detecting very small tumors. However, it fails to find 10-25% of tumors and is unable to distinguish between benign and malignant disease. New research provides a new and potentially more sensitive method using tumor-targeted magnetic nanoprobes and superconducting quantum interference device (SQUID) sensors.

A team of researchers from University of New Mexico School of Medicine and Cancer Research and Treatment Center, Senior Scientific, LLC, and the Center for Integrated Nanotechnologies facility at Sandia National Laboratories created nanoprobes by attaching iron-oxide magnetic particles to antibodies against HER-2, a protein overexpressed in 30% of breast cancer cases. Using these tiny protein-iron particles the team was able to distinguish between cells with HER-2 and those without, and were able to find HER-2 cancer cells in biopsies from mice. In their final test the team used a synthetic breast to determine the potential sensitivity of their system.

Dr Helen Hathaway explained, one million cells were pinpointed at a depth of 4.5 cm. This is about 1000x fewer cells than the size at which a tumor can be felt in the breast and 100x more sensitive than mammographic x-ray imaging. While researchers do not expect the same level of nanoparticle uptake in the clinic, the system has an advantage in that dense breast tissue, which can mask traditional mammography results, is transparent to the low-frequency magnetic fields detected by the SQUID sensors.

Future refining of the system could allow not only tumor to be found but to be classified according to protein expression (rather than waiting for biopsy results). This in turn could be used to predict disease progression and refine treatment plans and so improve patient survival.

www.biomedcentral.com/

Fast High Precision Eye-Surgery Robot Developed



Researcher Thijs Meenink at Eindhoven University of Technology (TU/e) has developed a smart eye-surgery robot that allows eye surgeons to operate with increased ease and greater precision on the retina and the vitreous humor of the eye. The system also extends the effective period during which ophthalmologists can carry out these intricate procedures. Eye operations such as retina repairs or treating a detached retina demands high precision. In most cases surgeons can only carry out these operations for a limited part of their career. Thijs Meenink told that when

ophthalmologists start operating they are usually already at an advanced stage in their careers,". "But at a later age it becomes increasingly difficult to perform these intricate procedures." The new system can simply filter-out hand tremors, which significantly increases the effective working period of the ophthalmologist.

The robot consists of a 'master' and a 'slave'. The ophthalmologist remains fully in control, and operates from the master using two joysticks. Two robot arms copy the movements of the master and carry out the actual operation. The tiny needle-like instruments on the robot arms have a diameter of only 0.5 millimeter, and include forceps, surgical scissors and drains. The robot is designed such that the point at which the needle enters the eye is always at the same location, to prevent damage to the delicate eye structures. Meenink has also designed a unique 'instrument changer' for the slave allowing the robot arms to change instruments, for example from forceps to scissors, within only a few seconds. This is an important factor in reducing the time taken by the procedure. Some eye operations can require as many as 40 instrument changes, which are normally a time consuming part of the overall procedure.

The surgeon's movements are scaled-down, for example so that each centimeter of motion on the joystick is translated into a movement of only one millimeter at the tip of the instrument. According to Meenink this greatly increases the precision of the movements," says Meenink. The master also provides haptic feedback. Ophthalmologists currently work entirely by sight -- the forces used in the operation are usually too small to be felt. However Meenink's robot can 'measure' these tiny forces, which are then amplified and transmitted to the joysticks. This allows surgeons to feel the effects of their actions, which also contributes to the precision of the procedure. The system developed by Meenink and Hendrix also offers ergonomic benefits. While surgeons currently are bent statically over the patient, they will soon be able to operate the robot from a comfortable seated position. In addition, the slave is so compact and lightweight that operating room staff can easily carry it and attach it to the operating table.

Scientists are enthusiastic about the system -- not only because of the time savings it offers, but also because the limits of manual procedures have now been reached. "Robotic eye surgery is the next step in the evolution of microsurgery in ophthalmology, and will lead to the development of new and more precise procedures. Both slave and master are ready for use, and Meenink intends to optimize them in the near future. The first surgery on humans is expected within five years. He also plans to investigate the market opportunities for the robot system. Robotic eye surgery is a new development; eye surgery robots are not yet available on the market.

<http://www.tue.nl/>

Paint-On Solar Cells Developed

Now the coat of paint on the outside of home can generate electricity from light electricity that can be used to power the appliances and equipment on the inside. A team of researchers at University of Notre Dame have made a solar paint that uses semiconducting nanoparticles to produce energy.

Prashant Kamat, John A. Zahm Professor of Science in Chemistry and Biochemistry and an investigator in Notre Dame's Center for Nano Science and Technology (Ndnano) told that they want to do something transformative, to move beyond current silicon-based solar technology.

By incorporating power-producing nanoparticles, called quantum dots, into a spreadable compound, they have made a one-coat solar paint that can be applied to any conductive surface without special equipment.

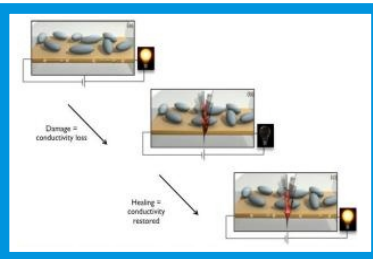
The team's search for the new material centered on nano-sized particles of titanium dioxide, which were coated with either cadmium sulfide or cadmium selenide. The particles were then suspended in a water-alcohol mixture to create a paste. When the paste was brushed onto a transparent conducting material and exposed to light, it created electricity.

This paint can be made cheaply and in large quantities by improving the efficiency. Scientist may be able to make real difference in meeting energy needs in the future. Kamat and his team have started work on the ways to improve the stability of the new material.

<http://www.nd.edu>



Self-Healing Electronics could Work Longer and Reduce Waste



A team of the researchers led by aerospace engineering professor Scott White and materials science and engineering professor Nancy Sottos at the University of Illinois has developed a self-healing system that restores electrical conductivity to a cracked circuit in less time than it takes to blink.

According to scientists, it simplifies the system and is designed to take care of the problem itself. In a multilayer integrated circuit, there is no opening it up. Normally the whole chip has to be replaced. It is true for a battery

too. A battery cannot be pulled apart to find the source of the failure. Most consumer devices are meant to be replaced with some frequency, adding to electronic waste issues, but in many important applications such as instruments or vehicles for space or military functions, electrical failures cannot be replaced or repaired.

The Illinois team previously developed a system for self-healing polymer materials and decided to adapt their technique for conductive systems. They dispersed tiny microcapsules, as small as 10 microns in diameter, on top of a gold line functioning as a circuit. As a crack propagates, the microcapsules break open and release the liquid metal contained inside. The liquid metal fills the gap in the circuit, restoring electrical flow.

Everything prior to this has been on structural repair. This is on conductivity restoration. A failure interrupts current for mere microseconds as the liquid metal immediately fills the crack. The researchers demonstrated that 90 percent of their samples healed to 99 percent of original

conductivity, even with a small amount of microcapsules.

The self-healing system also has the advantages of being localized and autonomous. Only the microcapsules that a crack intercepts are opened, so repair only takes place at the point of damage. Furthermore, it requires no human intervention or diagnostics, a boon for applications where accessing a break for repair is impossible, such as a battery, or finding the source of a failure is difficult, such as an air or spacecraft. In an aircraft, especially a defense-based aircraft, there are miles and miles of conductive wire, it cannot be found manually where the break occurs. The autonomous part is nice it knows where it broke. The researchers are particularly interested in applying the microcapsule-based self-healing system to batteries, improving their safety and longevity.

<http://illinois.edu/>

Forthcoming Tech Events

Information & Communication Technologies Exhibition & Conference 2012

07-09 January, 2012

Lahore, Pakistan

www.conferencealerts.com

9th International Bhurban Conference on Applied Sciences & Technology

09-12 January, 2012

Islamabad, Pakistan

www.conferencealerts.com

5th Power Generation Conference & Exhibition 2012

02 February, 2012

Karachi, Pakistan

International Trade & Industrial Machinery Show

21 -23 February, 2012

Karachi, Pakistan

www.itifasia.com

2nd International Conference on Energy, Environment & Sustainable Development

27 -29 February, 2012

Jamshoro, Sindh, Pakistan

www.conferencealerts.com

Materials Challenges in Alternative and Renewable Energy

26 February -01 March, 2012

Florida, USA

www.conferencealerts.com

MEGATECH Pakistan 2012

1-3 March, 2012

Lahore, Paksitan

www.megatechpakistan.com

The 2nd International Conference on Information Science and Technology

12.-23 March, 2012

Wuhan, China.

www.conferencealerts.com

8th International Conference and Exhibition on Ceramic Interconnect and Ceramic Microsystems Technologies 2012

16-19 April, 2012

Erfurt, Germany

Tech & Trade Offers

TRANSFORMER TURNS RATIO FINDER



This finder is designed and developed to meet the needs of local manufacturer of High Tension Transformers. It can measure the turns ratio of step down HT transformers in manufacturing. For measuring turns ratio of step up transformers contact the designer. The monitor's LCD displays primary voltage, secondary voltage and turns ratio simultaneously. The finder has a serial bus interface. By using serial port interface the finder communicates with personal computer (PC). The finder displays the results just by completing connections without pressing any button. This feature enables the users/ operators to use measurements/ results

for data record or future reference.

Company Contact:

National Institute of Electronics

Ahmed Nadeem Siddiqui (Director Marketing)

Address: Plot # 17, Street 6, Sector H-9/1, Islamabad

Phone: 92-51-9257379, 92-51-58501-03

Fax: 051-9258515

www.nie.gov.pk

Motorized Crockmeter



Crock Meter Motorized is an advance version of Crockmeter, operated by a geared motor

Standards: AATCC 8/165, ISO 105/D02, BSEN 20105

Specification: Rubbing Fastness Tester to determine the color fastness of textiles to dry or wet rubbing, wet

friction color fastness test of cotton chemical fiber all kinds of pure to spin or blending print and dye cloth scrub fastness of color test.

Company Contact**Mars Traders**

Mr. Ziauddin Qureshi [Chief Executive]

Address: A-51, Sector 11-B, North Karachi-75850, Pakistan

Mobile : 92-301-8235127

Phone: 92-21-2016522, 92-301-8235127

Fax : 92-21-5206702, 1-630-981-0641

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