

TECHNOLOGY ROUNDUP

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Tech News

Indigenous Technology

Most Rapid and Economic Method for the Quantitative and Qualitative Determination of Ciprofloxacin Using High Performance Liquid Chromatography

Ciprofloxacin is a widely used antibiotic and is marketed worldwide with over three hundred different brand names. It is also available for limited use in veterinary medicine. Because of its good market value it is analyzed in almost every pharmaceutical industry for the use in medicine. In industries, it is analyzed by various HPLC techniques. Some of these methods use ultraviolet (UV) detection, whereas others use expensive fluorescence and diode array detection which are not commonly available in every laboratory/industry. Nearly, all of the methods use buffer in their mobile phase which not only decrease the column life, but are very expensive as well.

Research from radiation Chemistry Lab, NCE, Physical Chemistry University of Peshawar developed an economic and rapid method for the quantitative and qualitative analysis of ciprofloxacin using HPLC. In this study the mobile phase used was water-methanol-acetonitrile-1 % acetic acid (15:15:20:50; v/v). The analysis was completed in less than 5min with UV-detection at 278nm. During this analysis it was observed that by increasing the concentration of methanol in mobile phase the retention time of ciprofloxacin was also increased. So, we optimized the effluent in the mobile phase to get good separation at short retention time.

Courtesy:

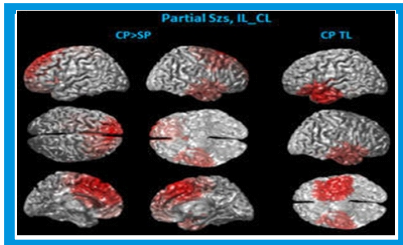
Murtaza Sayed, Hasan M.Khan
Radiation Chemistry Laboratory', NCE Physical Chemistry
University of Peshawar
E-mail: murtazasayed@unesh.edu.pk

Russia Joins the Supercomputer Race

The Russian Academy of Sciences (RAS) is building a supercomputer that will have a capacity of 10 petaflops, which would make it the most powerful in Russia. This supercomputer will surpass the current most powerful computer in Russia, the Lomonosov, which has a capacity of 1.7 petaflops. It is the beginning of the era of 10-petaflops computers. Energy efficiency will be a key feature of the new supercomputer, and when finished it will be one of the most energy-efficient machines in the world, ranking second in the Green 500 supercomputer rating. The system's energy efficiency is achieved with the help of the unique cooling system and cutting-edge x86 coprocessors. When fully operational, the supercomputer is expected to be one of the 10 fastest in the world. The RAS' Joint Supercomputer Center is absorbing and utilizing the technology and their goal is to complete the first two elements by the end of the year, and then the technology will make it possible to upgrade its capacity to 10 petaflops within a reasonable time that is over the next year provided there is adequate investment.

[Http://technews.acm.org/#603617](http://technews.acm.org/#603617)

Non-Invasive Method for Diagnosing Epilepsy



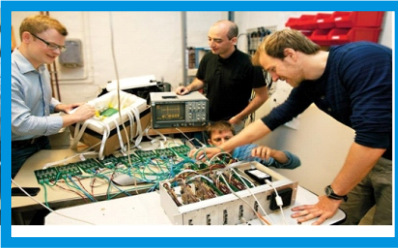
A team of University of Minnesota biomedical engineers and researchers from Mayo Clinic have carried out a study that outlines how a new type of non-invasive brain scan taken immediately after a seizure gives additional insight into possible causes and treatments for epilepsy patients. The new findings could specifically benefit millions of people who are unable to control their epilepsy with medication.

The biggest challenge for medical researchers is to locate the part of the brain responsible for the seizures to determine possible treatments. In the past, most research has focused on studying patients while they were having a seizure, or what is technically known as the "ictal" phase of a seizure. Some of these studies involved invasive methods such as surgery to collect data.

This study's findings show that through non-invasive method the important data about brain function can be gathered during as well as immediately after a seizure. It also shows that the frontal lobe of the brain is most involved in severe seizures and that the seizures in the temporal lobe are most common among adults. The new technique used in the study will also help to determine the side of the brain where the seizures originate. This is the first-ever study where new non-invasive methods are also used to study patients after a seizure instead of during a seizure. It's really a paradigm shift for research in epilepsy. In the study researchers used a novel approach by studying the brains of 28 patients immediately after seizures or what is technically known as the "postictal" phase of a seizure. They used a specialized type of non-invasive EEG with 76 electrodes attached to the scalp for gathering data in contrast to most previous research that used 32 electrodes. The researchers used specialized imaging technology to gather data about the patient. The findings may lead to innovative means of locating the brain regions responsible for seizures in individual patients using non-invasive strategies

[.Http://www.sciencedaily.com/releases/2012/08/120824130335.htm](http://www.sciencedaily.com/releases/2012/08/120824130335.htm)

New Cancer Scanner Halves the Radiation



Researchers in particle physics in the Department of Physics at University of Oslo (UiO), Norway have developed a completely new technology that makes it possible to halve radiation from a PET scanner. The PET scanner is also built at such a small scale that it can be placed inside an MR scanner. This makes it possible to take the MR and PET images at the same time.

PET (Positron emission tomography) provides a spatial image of where the cancer cells are located in the body. The current PET scanner examinations involve high levels of radiation. PET scans are harder to interpret if medical staff cannot situate the location of cancer cells in relation to the skeleton and soft tissue. This can be done by comparing PET images with an anatomical picture such as CT (computerized tomography) or MR (magnetic resonance) scans. CT scans provide a three-dimensional x-ray image of the body. MR scans photograph the body using radio waves and a powerful magnetic field. MR provides far better images of soft tissue than CT does. But the drawback of MR scans is that the examination is more expensive and takes much longer. The advantage is that MR does not emit ionizing radiation. Currently, most hospitals combine PET and CT, but this combination has a significant weakness. "The radiation from such an examination is ten times higher than the average background radiation over the course of a year. Many cancer patients must be examined multiple times to test whether the treatment is working. The total radiation during treatment can therefore be very high.

Particle physicists at UiO are the first in the world to develop a specially adapted PET/MR solution for scans of animals. "The high resolution in PET scanner provides better images, and the high sensitivity that makes it possible to use only half as much radioactivity in the examinations without it affecting the image quality. This opens new possibilities in research, and may also contribute to reducing radiation in clinical scanners, especially within mammography and brain scans.

[Http://www.sciencedaily.com/releases/2012/08/120822071430.htm](http://www.sciencedaily.com/releases/2012/08/120822071430.htm)

Cooking Simulator that Calculates Heat Transfer from Pan to Food

A research group at the Tokyo Institute of Technology has developed a cooking simulator having a force feedback fry pan and spatula to accurately recreate the sense of cooking.

This simulator calculates the heat transfer from the pan to the meat or vegetables that are being cooked, and displays the visible changes caused by heating. The fry pan interface allows for three dimensional input, and as well as moving the fry pan to aid the cooking process, the simulator can feed back the weight of ingredients combined with the tactile feeling of the ingredients cooking. When one moves the frying pan, the actual movement is input, and one can feel the ingredients through the pan. Also, the upper part of the system is a screen. When one looks into the pan, he can see what's in it through a half-mirror. So this simulator lets to experience looking into the frying pan while holding it.

This technology combines a rigid-body physics engine library and a heat conduction simulator. The



heat conduction state changes in line with the amount of physical contact, and the simulation is achieved by combining them. It also calculates how moisture evaporates or flows as the temperature rises. It shows how protein changes color from red to brown, or how vegetables turn dark, by synthesizing textures. The researchers are looking forward to develop this system further, so it's helpful in actual cooking at home. It could help to make the cooking meat taste even better. If it could be linked to a system that can tell that in five minutes, the food will look like this, and in ten minutes, it will look like this, which you would prefer to select, so this system could really help with cooking.

<http://www.nd.edu>

Super Rice Bags That Keep Bugs at Bay



International Rice Research Institute (IRRI) and Grain Pro Inc. Philippines have developed and manufactured a Super Grain bag. The Super Grain bag is an airtight, reusable plastic bag that protects stored rice from moisture, pests, rats, and keeps rice seeds viable. It works by blocking the flow of both oxygen and water vapor from external environment to the grain. This bag reduces post-harvest losses up to 15 percent from poor storage conditions, which also lead to a loss in grain

quality. When properly sealed, the bag allows farmers to safely store their seeds for 9 to 12 months without reducing germination rates.

The bags provide a non-chemical alternative for keeping out insects and rats and improve the percentage of whole rice grains recovered after milling by around 10 percent. It is now available to Filipino farmers in almost 200 retail stores nationwide. The IRRI, through its national partnerships, has verified the benefits of the Super Grain bag with tens of thousands of farmers throughout Asia.

www.irri.org

Technology to Develop Low-Cost, High Efficiency Solar Cells

Researchers from the U.S. Department of Energy (DOE) Lawrence Berkeley National Laboratory (Materials Sciences Division) and Berkeley Physics Department, the University of California (UC) have developed a technology that would enable low-cost, high efficiency solar cells to be made from virtually any semiconductor

material. This technology opens the door to the use of plentiful, relatively inexpensive semiconductors, such as the promising metal oxides, sulfides and phosphides that have been considered unsuitable for solar cells because it is so difficult to tailor their properties by chemical means. It also allows to sidestep the difficulty in chemically tailoring many earth abundant, non-toxic semiconductors and instead tailor these materials simply by applying an electric field.



This technology reduces the cost and complexity of fabricating solar cells thereby providing an important cost-effective and environmentally friendly alternative that would accelerate the usage of solar energy.

This new technology also called screening-engineered field-effect photovoltaics or SFPV, because it utilizes the electric field effect, a well understood phenomenon by which the concentration of charge-carriers in a semiconductor is altered by the application of an electric field. With the SFPV technology, a carefully designed partially screening top electrode lets the gate electric field to sufficiently penetrate the electrode and more uniformly modulate the semiconductor carrier concentration to induce a p-n junction. The key to this successful technology is the minimal screening of the gate field which is achieved through geometric structuring of the top electrode. This makes it possible for electrical contact to and carrier modulation of the semiconductor to be performed simultaneously.

Under the SFPV system, the architecture of the top electrode is structured so that at least one of the electrode's dimensions is confined. In one configuration, working with copper oxide, the Berkeley researchers shaped the electrode contact into narrow fingers; in another configuration, working with silicon, they made the top contact ultra-thin (single layer graphene) across the surface. With sufficiently narrow fingers, the gate field creates a low electrical resistance inversion layer between the fingers and a potential barrier beneath them. A uniformly thin top contact allows gate fields to penetrate and deplete/invert the underlying semiconductor. The results in both configurations are high quality p-n junctions

[Http://www.sciencedaily.com](http://www.sciencedaily.com)

Record Efficiency for Next-Generation Solar Cells



Researchers from the University of Toronto and King Abdullah University of Science & Technology (KAUST) have made a breakthrough in the development of colloidal quantum dot (CQD) films, leading to the most efficient CQD solar cell ever.

Previously, quantum dot solar cells have been limited by the large internal surface areas of the nano particles in the film, which made extracting electricity difficult while in this breakthrough combination of organic and inorganic chemistry completely cover all of the exposed

surfaces. This cell represents a 37% increase in efficiency over the previous certified records. In order to improve efficiency, the researchers needed a way to both reduce the number of "traps" for electrons associated with poor surface quality while simultaneously ensuring that their films were very dense to absorb as much light as possible. The solution was a so-called "hybrid passivation" scheme. Introducing small chlorine atoms immediately after synthesizing the dots, the previously unreachable nooks and crannies that lead to electron traps have been patched by introducing small chlorine atoms immediately after synthesizing the dots, followed by short organic linkers that bind quantum dots in the film closer together. This organic ligand exchange was necessary to achieve the densest film.

The state-of-the-art synchrotron methods with sub-nanometer resolution to discern the structure of the films with hybrid passivation method led to the densest films with the closest-packed nanoparticles. This research opens up many avenues for further research and improvement of device efficiencies, which could contribute to a bright future with reliable, low cost solar energy.

According to the researchers since the world urgently needs innovative, cost-effective ways to convert

the sun's abundant energy into usable electricity. This breakthrough shows that the abundant materials interfaces inside colloidal quantum dots can be mastered in a robust manner, proving that low cost and steadily-improving efficiencies can be combined.

[Http://www.sciencedaily.com](http://www.sciencedaily.com)

Forthcoming Tech Events

Lable-Free Technologies: Advances & Applications

01-3 Nov, 2012

NH Ground Hotel, Kransapolshy, Amsterdam, The Netherland

WWW.biztradeshow.com

Used Machinery Expo

2-4 November, 2012

Hyderabad International Trade Exposition Centre, Hyderabad, India

WWW.biztradeshow.com

CMMIT Mid Technology Conference and User Group

5-8 November, 2012

Hayat Regency Tech Centre, Denver, USA

WWW.biztradeshow.com

Gem Faire-Eugene

2-4 November, 2012

Lane Events Centre, Eugene, Oregon, USA

WWW.biztradeshow.com

International Petroleum Technology Conference

05-7 December, 2012

China World Trade Centre, Beijing, China

WWW.biztradeshow.com

MEGATECH Pakistan 2013

28-30 March, 2013

Expo Centre, Lahore, Paksitan

www.megatechpakistan.com

Tech & Trade Offers

UL-SAFE (Famotidine)

UL-SAFE (Famotidine) is indicated in Gastric ulcer, GERD and hypersecretory conditions.

Dosage:

Acute Duodenal Ulcer:	Ul-Safe 40mg at bedtime for 4 weeks
Benign Gastric Ulcer:	Ul-Safe 40mg at bedtime for 4-8 weeks
Gasto-Oesophageal Reflux Disease:	Ul-Safe 20-40mg twice daily for 6-12 weeks (depending upon the severity of disease)
Zollinger-Ellison Syndrome:	Ul-Safe 20mg 6 hourly, increase as necessary
Maintenance Therapy in	Ul-Safe 20mg at bedtime duodenal ulcer and benign Ulcer

Company Contact

Sydon Pharmaceutical Industries (Ltd)
(ISO-9001-2000)

Syed Muhammad Tariq (CEO)

Ahmed Nadeem Siddiqui (Director Marketing)

Address: 77/A, Hayatabad Industrial Estate
Peshawar, Pakistan

Phone: 92-091-5816800

Fax: : 92-091-5823700

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Company Contact

MAK PUMPS (Pvt) Ltd
(ISO-9001-2000)

Irfanullah Khan Kundi

Address: Plot No. 87, Hayatabad Industrial Estate
Peshawar, Pakistan

Phone: 92-091-5812473-3

Fax: 92-091-5836254

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