Technology Scan

ASIA-PACIFIC

AUSTRALIA

Breakthrough for carbon nanotube materials

In collaboration with scientists from the NanoTech Institute of the University of Texas at Dallas (UTD) - CSIRO has achieved a major breakthrough in the development of a commercially-viable manufacturing process for a range of materials made from carbon nanotubes.

Carbon nanotubes possess a number of qualities - high tensile strength, high flexibility, high electrical and thermal conductivity, and transparency - which have excited great interest in a number of manufacturing industries including the electronic, automotive, energy and clothing industries. The flexible carbon nanotubes have been spun into ribbons that conduct electricity efficiently - and are five times stronger than steel.

Until now, the application of carbon nanotube technology has been severely limited due to the lack of a cost-efficient method of producing large sheets of carbon nanotube material.

However - as reported in the prestigious international scientific journal, "Science" - the UTD/CSIRO team recently demonstrated that synthetically made carbon nanotubes can be commercially manufactured into transparent sheets that are stronger than steel sheets of the same weight.

Carbon nanotube materials have a number of potential applications in, for example: organic light emitting displays, low-noise electronic sensors, artificial muscles, conducting appliqués and broad-band polarized light sources that can be switched in one ten-thousandth of a second.

Starting from chemically grown, self-assembled structures in which nanotubes are aligned like trees in a forest, the sheets are produced at up to seven meters per minute. Unlike previous sheet fabrication methods - using dispersions of nanotubes in liquids - this dry-state process produces materials made from the ultra-long nanotubes required to optimize their unique set of properties.

http://www.csiro.au

BANGLADESH

Flood forecasting technology

The Bangladesh Water Development Board has adopted a long-time flood forecasting technology to cope with the perilous impact of climate change. Instead of the existing 3-day forecasting technology, the long-time one consists of three types of forecast schemes - short term (1-10 days), medium term (20-25 days) and long term (1- 6 months) - the local daily *The Independent* reported. Five pilot areas in the country have been selected for testing the application of the newly introduced technology.

Besides, a 10-year disaster management plan has been taken under the framework of Global Earth Observation System of Systems to improve sustainable water resources management in the country.

Under the plan, Bangladesh is going to evolve another flood recasting model to be applied in the major river Meghna, and the country's remaining river basins will be brought under the model in phases attuned to the Meghna model. Floods become particularly common in the monsoon season in Bangladesh from June to September every year.

http://www.hindu.com

CHINA

Rice without longevity gene

A study team, led by Zhang Qifa, a CAS academician at Huazhong Agriculture University, has cloned a gene able to inhibit the longevity of rice, using the mutant marker separation technique. The gene allows rice to go from the vegetative phase to the reproductive phase. Without the gene, rice would keep growing leaves and stalk without flowering and fruiting. A paper on the new gene, or RID1 (Rice Indeterminate 1), was published in the recent issue of the *Proceedings of the National Academy of Sciences*.

Study results show that the RID1 gene acts as the master switch for the transition from the vegetative to the reproductive phase. RID1 encodes a Cys-2/His-2-type zinc finger transcription factor that does not have an ortholog in *Arabidopsis spp*. This mutation-suppressed expression of the genes is known to be involved in flowering regulation. RID1 seems to be independent of the circadian clock. A model was proposed to place RID1 in the molecular pathways of flowering regulation in rice. Once the phase transition is induced with the activation of RID1, flowering signal is transduced and regulated through the various pathways, and eventually integrated with FT-like proteins to induce flowering.

Zhang said that the separation of RID1 is of theoretical importance to understanding the plant flowering mechanism and regulating the timing and nature of flowering at the molecular level. The study also deepens people's understanding of the flowering mechanisms of monocotyledonous and dicotyledonous plants. Furthermore, flowering time determines the seasonal and regional adaptability of rice, which, in turn, affects the rice yield. The finding can be used to improve the regional adaptability of rice, raising the yield. It can also be used to improve other species, such as *Platanus Orientalis* L. (a tree that never flowers), and grazing grasses that have a delayed flowering.

http://www.most.gov.cn

Recombinant cancer drug

The Chinese Ministry of Science and Technology announced on July 11, 2008 that thanks to an 8-year effort and the support of the National 863 Program, h-R3 (Nimotuzumab), China's first recombinant cancer drug, has been approved by the State Food and Drug Administration as a new drug for bulk production.

H-R3, developed by Biotech Pharma, a joint venture established by both China and Cuba, enjoys numerous

merits, including strong target orientation, high specificity, enhanced treatment results, and low side effects. Representing a new direction for targeted molecular cancer treatment, the Chinese made H-R3 has registered a humanization degree as high as 95 per cent, in a leading position compared with its overseas counterparts. While meeting the domestic needs, the new drug has embarked on export.

http://www.most.gov.cn

INDIA

CSIR Technology Awards - 2008

Union Minister for Science & Technolgy and Earth Sciences, Shri Kapil Sibal gave away the CSIR Technology Award 2008 for Life Sciences to 'Team CCMB' of the Centre for Cellular and Molecular Biology, Hyderabad; CSIR Technology Award 2008 for Innovation to 'Team CDRI' of the Central Drug Research Institute, Lucknow; and CSIR Technology Award 2008 for Business Development & Technology Marketing to 'Team URDIP' of the Unit for Research and Development of Information Products, Pune.

Team CCMB has won the award for developing a novel universal technique to establish the identity of an enormous number of animal species for forensic applications. The developed technique is based on the polymerase chain reaction (PCR), which, without knowing the history of a forensic sample, is able to reveal whether the source of the sample is human or animal, and if animal, which animal.

The technique is simple and uses one set of novel primers to amplify and sequence the PCR amplicons. The molecular technique can be applied universally with a tiny piece of meat, a drop of blood or even a single hair originated from any of the thousands of species of animals, including any of the threatened and/or endangered animals. International patents have been obtained for this innovation.

Team CDRI has won the award for the discovery of guggulsterone and the development of analogues with a novel mechanism of action as hypolipidemic agents. The innovation involves the development of a potent lipid lowering formulation to fight the widely prevalent metabolic syndrome encompassing hyperlipidemia, insulin resistance, diabetes and hypertension.

Several structural analogs of Guggulsterone have been designed and synthesized following a lead from Gugulipid. The most active Guggulsterone analogue has undergone appropriate biological profiling through regulatory pharmacology, toxicity and pharmacokinetics. The Phase III multi-centric clinical trials for efficacy evaluation in patients of hyperlipidemia is under progress in collaboration with Cadilla Pharma, Ahmedabad. CDRI has secured several patents on the development.

Team URDIP has won the award for creating the niche in the knowledge-based service sector. URDIP has designed, developed and provided value-added information services in the areas of Patinformatics, Phytoinformatics and Toxinformatics. URDIP is involved in the pre-research and pre-development phase of the research projects. The output of URDIP's services is used by clients to identify new emerging applications, new directions for product development, discover trends in competing technology approaches and competitor watch.

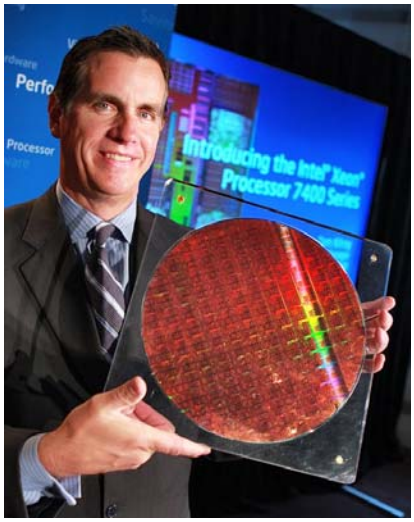
These studies enable companies to drive their research strategy and innovation. Over the years, URDIP has acquired an excellent stature in Patinformatics and their services are sought by several research institutions and small, medium and large enterprises and multinationals. URDIP has registered a sustainable commutative growth of over 65 per cent in the last three years.

CSIR Technology Awards, given annually, were instituted in 1990 with a view to foster and encourage in-house multidisciplinary team efforts and external interaction for technology development, transfer, marketing and commercialization. The award carries a cash prize of Rs. 200,000, a plaque and a citation in each category.

http://pib.nic.in

Intel processor

The launch of the microprocessor is a landmark achievement in the computer hardware research and development scene in India. Intel launched the first microprocessor that it has almost completely developed at its Bangalore design centre. This six-crore Xeon 7400 Series processor is a server class processor, capable of handling intensive enterprise applications. It will be the first one to boast of six cores. The previous processors had up to four cores.



Tom Kilroy,Vice President and General Manager of Intel's Digital Enterprise Group, displays a wafer from Intel's new Xeon 7400 Processor family, formerly codenamed Dunningtonat a news conference in San Francisco.

Since this chip is meant for businesses, it had to go through a more stringent quality control and testing process. Containing 1.9 billion transistors with 16 MB shared L3 cache and based on the latest 45 nm High-K fabrication process, this chip was also tested by Intel's Bangalore laboratories to ensure that it is compatible with most of the existing and forthcoming software.

Being a server processor, Intel's Xeon 7400 will be used in the high-end segment of the global server market. Codenamed "Dunnington", it is designed to handle heavy workloads typically associated with memory intensive business applications like RDBMS, enterprise resource planning programmes,

etc. It will find application in servers used at places like the stock markets, investment banks, etc.

According to IDC research company, this industry has generated total sales of $ 13.9 billion in the second quarter ending June. The president of Intel India, Praveen Vishakantaiah, said "It's not just services and software that India is known for, but this also shows that this kind of complex research and development and product design can be done here in India." Known in the west more for its outsourcing and software services, this development will prove to the west that India is no less in the hardware designing and development field either.

http://www.techtree.com

Nanoparticle research

FEI Company, a leading provider of high-resolution imaging and analysis systems, announced the installation of a solution based upon FEI's Tecnai™ Spirit cryo-transmission electron microscope (TEM) and three-dimensional (3D) tomography software at Sun Pharmaceutical Industries, Ltd., Mumbai, India. Sun Pharmaceutical will use FEI's 3D imaging solution for quality control of drug-loaded vesicles to speed up the development of new therapeutics.

"The cost of developing drugs and bringing new products to market is enormous and rising yearly; having access to accurate and timely information is essential for making decisions on compounds in our pipeline," said Dr. Subhas Bhowmick, Vice President formulation development, Sun Pharmaceutical. "We will use the FEI 3D imaging solution to gain a better understanding of the behaviour of the drug in the human body in an effort to develop therapeutics that not only are more effective, but also exhibit reduced side effects. The information will also help us shorten the drug development process and bring new therapeutics to market faster."

Cryo-TEM allows life science researchers to study biological systems in their native, hydrated state and obtain unique information about the particle structure and function. Other (non-cryo) microscopy and preparation techniques can damage the fragile biological sample and do not preserve the structure needed for 3D reconstruction information.

FEI's tomography software allows for the system's automation to acquire and process thousands of images unattended. FEI's 3D imaging solution can also aid in the pharmaceutical production process; for example, new drug delivery techniques, such as encapsulating a drug in a liposome, can be monitored during production by visualizing the particle. These new drug delivery techniques utilize labeled liposomes that are transferred directly to the site of interest (such as a tumor cell) and enable targeted delivery of drugs without harming healthy tissue.

Sun Pharmaceutical is an international pharmaceutical company that makes many generic and brand name drugs for worldwide distribution. Sun manufactures both pharmaceuticals and active pharmaceutical ingredients (API), and its products are used in several therapeutic areas, including oncology, psychiatry, neurology, cardiology, diabetology, gastroenterology, respiratory and orthopedics. FEI's 3D imaging solution has been installed in the Sun Pharma Advanced Research Centre located in Vadodara, Gujarat, India.

For more informtion, contact:
Fletcher Chamberlin
(investors and analysts)
Investor Relations
FEI Company
Tel: (+91-503) 726 7710
E-mail: fletcher.chamberlin@fei.com

JAPAN

Patent for stem cell breakthrough

Japan has given Kyoto University a patent for groundbreaking stem cell research in what is believed to be a world first for such scientific research, officials said. The move is aimed at preventing a pharmaceutical company from taking its own patent and then seeking money from researchers for their work, university officials said.

In 2007, teams at Kyoto University and at the University of Wisconsin at Madison in the United States discovered how to use skin to produce stem cells - which can develop into various organs or nerves. The finding was hailed by the Vatican and US President George W. Bush because it can circumvent an ethical row over conventional stem cell research using human embryos.

"It is important for the university to keep a patent so it can conduct medical research and treatment at low costs in the future," said Naoko Takasu, who is in charge of intellectual property issues for the university.

She said it was the first patent in the world for stem cells and that the university in western Japan would also seek patents in other major developed countries.

Shinya Yamanaka, the head of the research team, said he was "delighted" at the issuance of the patent. "This is a first step," he said in a statement. "I will continue my utmost efforts in this research ... so as to accelerate its practical application in clinical treatment."

Stem cell research is seen as having the potential to save lives by helping to find cures for diseases such as cancer and diabetes or to replace damaged cells, tissues and organs. But religious conservatives argue that research on embryos destroys human life, albeit at its earliest stage of development.

Anticipating growing international competition in the field, Japan - the largest spender on research after the USA - announced a 10 billion-yen (92 million-dollar) plan to advance stem cell studies. Another group of Japanese scientists said last month that they had derived stem cells from wisdom teeth, opening another way to study deadly diseases without the ethical controversy of using embryos.

http://afp.google.com

REPUBLIC OF KOREA

Wireless digital repeater

A Korean venture start-up developed a next-generation repeater that dramat-

ically improves the quality of wireless service. MNW, a Korean manufacturer of mobile communication equipment, and Korea Polytechnic University jointly developed a wireless digital laser repeater using digital laser transmission technology. The repeater is easy to install and highly cost-effective, and MNW already filed patents for related technologies.

Compared to optical cable repeaters, the digital laser repeater reduces installation costs by 30 per cent and recovers the loss caused during the transmission of large data almost completely. Accordingly, the next-generation repeater secures a high quality of service catering to 3G or WiBro services requiring large capacity and high performance.

The digital repeater digitalizes the signals from base-stations and delivers them on lasers. Unlike analogue laser transmission, the digital laser repeater is not affected by weather conditions (snow, rain, fog, etc.).

Digital laser transmission enhances the quality of voice and video signals; prevents interference with other repeaters; eliminates urban shadow areas; and removes the need for isolation between sending and receiving antennas.

With the USA, Japan and the EU intending to enlarge WCDMA capacities, the technology has great opportunities in the global market as well as in Korea. MNW expects that the digital laser repeater technology will be adopted as an international standard for the next generation mobile communications.

http://www.telecomskorea.com

EUROPE

Technologies for better network management

The EUREKA-funded CELTIC MADEIRA project, winner of the 2008 CELTIC Excellence Award, has successfully applied new ways to manage large telecommunications networks using a web-based interface.

The term 'network management' refers to the operation, administration, maintenance, and provisioning of networked computer systems. This means keeping the network up and running smoothly, keeping track of resources and performing repairs and upgrades. Today's management systems struggle to cope with the enormous amounts of information being created and exchanged in large networks, for example in the telecommunications sector, which delivers services on a continual 24x7 basis.

Partners in the Celtic Madeira project carried out research in the area of large-scale telecommunications networks, developing new technologies for an advanced Network Management System (NMS).

DuPont's housing for the concentrated photovoltaic module

The large housing for the concentrated photovoltaic module, measuring 83.3 cm x 56.5 cm, is moulded from DuPont™ Rynite® polyethylene terephthalate (PET) due to the material's good dimensional stability, low distortion, attractive surface qualities and excellent melt flow.

According to project coordinator Liam Fallon of Ericsson Ireland, network operators have to provide high quality services under conditions of vastly increased numbers and technological diversity of network elements, e.g. individual computer terminals.

Madeira's main aim was to facilitate the deployment of self-managed services, enabling better, more seamless management of this kind of very large and diverse network. Madeira focused on developing an innovative platform enabling network management from a central computer as well as from distributed elements like individual computers in a cooperative manner.

Madeira comprised a consortium of six organizations, each highly competent in aspects of networks, network services and associated management. Project work packages addressed network architecture, platform technology, self-aware management, and data modelling and management.

The project also included the development of prototype applications to test and demonstrate the envisaged concepts. The result is an innovative and advanced system enabling adaptable services and management of network elements of increasing scale, heterogeneity and transience.

Madeira partners say the results could also mean reduced operating expenses, because an increasingly self-aware, machine-to-machine-based network requires fewer skilled human operators.

http://www.innovations-report.com

UK

Nanoparticles research aids drug development

Scientists at the University of Liverpool in the UK have developed a new technology which can dramatically improve the effectiveness of antibacterial treatments.

Drugs with the ability to dissolve have much stronger efficacy, however many drugs are insoluble. In order to compensate, drugs often need to be administered in higher doses. This increases the possibility of bacteria and other organisms mutating as the high doses make it easier for them to build resistance to the drugs. This leads to treatments becoming obsolete and the need for new medicines to be developed.

Chemists at the University of Liverpool working with IOTA NanoSolutions have now developed a new technology to produce nanoparticles of insoluble drugs that mimic the behaviour and the effectiveness of dissolved drugs. Nanoparticles are man-made particles manufactured for use in a number of industries including the cosmetic and phar-

maceutical industry; they can make materials stronger, lighter and cleaner.

Recent data has shown that in some cases, low concentrations of insoluble drugs in a nanoparticle form can be more active than previously thought, offering the potential to administer drugs in low dosages without reducing the effectiveness of the treatment. The new technology is allowing the scientists to develop new medicines by converting currently available drugs into a nanoparticle form. Antiparastitic drugs to treat malaria are also being developed in collaboration with the Liverpool School of Tropical Medicine.

Professor Steve Rannard, from the Department of Chemistry who is also co-founder and current Chief Scientific Officer of IOTA NanoSolutions, said: "Already our technology has shown the potential to improve a range of current medicines and may lead to treatments that prevent drug resistance. If our approach can deliver new antimalarial treatments, it may help to prevent millions of deaths per year and improve the lives of hundreds of millions of current malaria sufferers."

This research is published in "Nature Nanotechnology".

http://www.sciencedaily.com

NORTH AMERICA

CANADA

'Lock and key' proteins behind diseases

A new technology developed at the University of Toronto is revealing biochemical processes responsible for diseases such as cystic fibrosis and could one day pave the way for pharmaceutical applications. A study appearing in an issue of *Molecular Cell* describes how the University of Toronto and Johns Hopkins university researchers designed a device to test for proteins that play an important role in human health and disease.

The technology, iMYTH (or integrated membrane yeast-two hybrid system), scans cells to detect proteins that interact with key proteins called ATP-binding cassette (ABC) transporters proteins that, when impaired, can cause disease. One of the best known ABC transporters is the Cystic Fibrosis Transmembrane Conductance Regulator (CFTR), which, when disabled by mutation, causes cystic fibrosis, a hereditary disease that results in progressive disability and early death.

Another important ABC protein is the Multidrug Resistance Protein (MRP), which normally removes drug metabolites and toxins from cells in our bodies but when overzealous can contribute to the drug resistance of tumours, thereby thwarting chemotherapy.

"All the cells in our bodies contain transporters that are poised in cellular membranes and act as gatekeepers to allow the entry of certain substances, like nutrients, into the cell and promote the export of other substances, like toxins, out of the cell," says Professor Igor Stagljar, Department of Medical Genetics and Department of Biochemistry at the university of Toronto and lead author of the study. "When the function of these transporters is impaired, disease can result. This device gives us insights as to what proteins are interfering with this process."

iMYTH works by scanning cells to reveal proteins that fit with the transporters, the only screening system sophisticated enough to work with delicate membrane proteins. Simply, if two proteins interact in iMYTH, they will stain the yeast cell blue. "Like lock and key, if two proteins interact with one another, it is safe to assume they participate or regulate the same cellular process," explains Stagljar. "Identifying new interactors for ABC transporters may reveal unanticipated aspects of how these transporters function and help researchers gain clues for fighting disease and drug resistance."

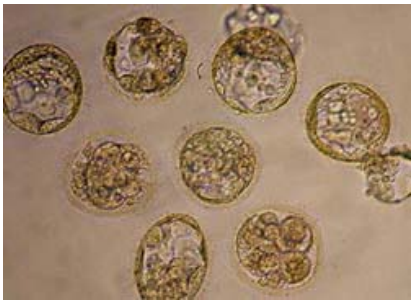
Using iMYTH, the Stagljar lab identified six proteins that interact with and presumably communicate with the ABC transporter Ycf1p, a yeast version of the human proteins CFTR and MRP. These newly discovered protein interactors represent novel potential pharmaceutical targets. Through a series of biochemical and genetic tests, the researchers discovered that one of these interactors, Tus1p, regulates Ycf1p transporter function in a completely novel way to stimulate its ability to remove toxins from the cell.

For more information, contact:
Karen Kelly
University of Toronto
E-mail: k.kelly@utoronto.ca
Tel: (+1-416) 978 5949

http://news.bio-medicine.org

USA

Embryonic stem cell alternative



Researchers have refined an experimental process that could produce stem cells without needing to create and destroy human embryos. The process turns adult cells into what are called induced pluripotent stem cells (iPS cells) believed to have high potential for therapeutic treatments for many severe medical conditions. New research has reportedly eliminated iPS cells' tendencies to become cancerous.

Last year scientists discovered how to generate iPS cells by introducing four genes into mice adult cells using retroviruses. The genes changed the cells into a state similar to that of embryonic stem cells. However, such retroviruses can cause cancer in animals and can integrate their own DNA into that of the host cells. Hochedlinger and his colleagues used a different virus, called an adenovirus, to introduce the same four genes into mice adult cells.

Tests showed that the cells produced by the new method were indistinguishable from embryonic stem cells and could be transformed into any type of tissue such as lung, heart, brain, and

muscle. Unlike the retrovirus-treated cells, the adenovirus-treated cells do not produce cancerous tumors.

"What our experiment shows is you can do this without an integrating virus. You do not need integration of the DNA into the genome to produce iPS cells," Hochedlinger said.

Robert Lanza, a stem cell researcher at Advanced Cell Technology in Worcester, Massachusetts., called the research a "huge step forward," saying the cancerous properties of earlier iPS cells prevented clinical therapies from being developed. "The use of iPS cells to treat or even cure human disease may not be far away," Lanza told the Washington Post.

Rudolf Jaenisch, a professor of biology at the Whitehead Institute in Cambridge, Massachusetts, praised the new findings but said the new process is 100 times less efficient than the retrovirus technique.

According to the Washington Post, Hochedlinger said his team is trying to streamline the production process, perhaps by supplementing the new genes with chemicals that flip biological switches. Critics of embryonic stem cell research praised the findings as evidence that ethically questionable embryonic research is unnecessary.

http://catholicnewsagency.com

New nanoscale process

Smaller. Faster. More efficient. These are the qualities that drive science and industry to create new nanoscale structures that will help to speed up computers. Scientists at the University of California, Santa Barbara have made a major contribution to this field by designing a new nanotechnology that will ultimately help make computers smaller, faster, and more efficient. The new process is described in the journal *Science*.

For the first time, the UCSB scientists have created a way to make square, nanoscale, chemical patterns - from the bottom up - that may be used in the manufacture of integrated circuit chips as early as 2011. It is called block co-polymer lithography. Five leading manufacturers, including Intel and IBM, helped fund the research at UCSB, along with the National Science Foundation and other funders. The university has already applied for patents on the new methods developed here, and it will retain ownership.

A multidisciplinary team led by Craig Hawker, materials professor and director of the Materials Research Laboratory at UCSB, with professors Glenn Fredrickson and Edward J. Kramer, have developed a novel process for creating features on silicon wafers that are between five and 20 nanometers thick. (A nanometer is the thickness of one-thousandth of a human hair.)

Using this technique, the size of the features is about the same as that of the molecules. They are very small, between five and 20 nanometers. "With this strategy, we can make many more features," said Hawker, "and hence we can pack the transistors closer together and everything else closer together - using this new form of lithography." When this technique has been tried before, the molecules spontaneously self assembled into hexagonal arrays; they look like bee hives. But since industry uses parallel lines on a square or rectangular grid, the hexagonal arrays have limited application.

An analogy that Hawker uses in describing the development of the new methodology of block co-polymers is that of mixing salad dressing. "Think of the block co-polymers as oil and water," said Hawker. "When you make salad dressing you shake up the bottle because the oil and water don't want to be together. They separate into two layers. You shake your salad dressing and you mix everything up into much smaller droplets. What we've done is taken two polymer molecules that hate each other and joined them together. And so they want to separate just like the oil and water in your salad dressing. But because we've molecularly joined them, they can't. And so they separate into very, very small droplets, or domains, based on the fact that they hate each other. Those are the BCPs."

He explained that the interesting feature about this work is that the scientists combined the repulsive force with another self-assembly force which is slightly attractive. "What we do is take one BCP (made of two components that hate each other) another BCP (again made of two components that hate each other) and simply mix these together," said Hawker. "When we mix them together, we've designed groups on one chain to be attracted to groups on a different chain, and so they actually start to blend and mix together. It is this combination of all these forces trying to get away from each other, and attract to each other that allows us to make the square arrays. Whereas what nature gives you is hexagonal, if you just use a single component system."

The scientists design the BCPs to have specific structures. And they use simulation to define the structures that are needed to prepare. "We design the molecule by understanding what needs to happen during the self-assembly process," said Hawker. "We need one block to be oil-like and one block to be water-like. So that's our first level of sophistication. We then design the molecular weight or the size of the molecule, to give us the desired feature size."

In the next step, the scientists design into the oil block the sticky groups that will form this attractive interaction, and by controlling the number of sticky groups, different levels of phase separation and different structures are created. Polystyrene is the oil-like block, and one of the water-soluble blocks is polyethylene glycol. Polyethylene glycol is found in shampoos and many consumer products. It's a non-toxic, water-soluble, biocompatible polymer. By putting those together, the polyethylene glycol loves the water and the polystyrene loves the oil, and they hate each other. Polystyrene is found in disposable coffee cups, and according to the scientists is a fairly cheap commodity material that if designed in the right way, becomes a high value added application.

http://www.sciencedaily.com