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**CHINA SCIENCE AND TECHNOLOGY**

# **NEWSLETTER**

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**SPECIAL ISSUES**

**Ambassador for New Energy Auto**



Madame YANG Lan became an Ambassador for new energy autos

To make more people aware of the new energy autos employed in the Beijing Olympic Game in 2008, mobilizing the whole society to be part of energy saving, and diffusing the knowledge of energy efficiency, emission reduction, and new energy, WAN Gang, Chinese Minister of Science and Technology (MOST), and Chairman of the Steering Panel of S&T Olympic Game Action Plan, issued on May 8, 2008 a certificate to YANG Lan, honoring her an Ambassador for new energy autos that will be used in the Game.

To support the Game with science and technology, MOST, in collaboration with Beijing municipal government, will make some 500 electric, hybrid, and fuel battery vehicles to be part of the transport system designed for the Game, in an attempt to demonstrate zero emission in the Olympic Park, and a reduced emission in the adjacent areas.

### 42 Million S&T Personnel

A news conference, sponsored by China Association for Science and Technology, was held on April 29, 2008 in Beijing, where a study report on China's S&T workforce was published. The report shows that as of the end of 2005, China has had an S&T workforce of 42 million people. The report has made 2.15 million technicians part of the statistics, the first try in calculating S&T workforce.

As far as the sectional distribution of S&T workforce is concerned, the primary industry has claimed a share of 680,000, the secondary industry 14.33 million, and the tertiary industry 26.44 million, or half of the total workforce. The report also indicates that China's S&T workforce remains low as a proportion of total population, though it has reached 42 million in number, with a large gap from the developed countries. Starting from this year, China Association for Science and Technology will continue to publish S&T workforce report on a

yearly basis.

## INTERNATIONAL COOPERATION

### China-Europe Infectious Diseases Seminar

Experts on microbiology, infectious diseases, and vaccines from China, France, Germany, the UK, Italy, Switzerland, and Austria, recently gathered together at a seminar jointly sponsored by EFBIC and China National Center for Biotechnology Development, to call for an intensified international cooperation in studying and preventing emerging and reemerging infectious diseases. YANG Weizhong, Deputy Director of China Diseases Prevention and Control Center, pointed out that China is facing a tough epidemic situation of infectious diseases. He said China has adopted a string of measures to fence off the possible spread of infectious diseases. For example, China has increased investment in establishing needed public sanitation systems, upgrading relevant legislations, and developing new technologies for monitoring and preventing infectious diseases.

### Unveil Human Intestinal Flora

Chinese scientists kicked off on May 6, 2008 their part of a European project named MetaHIT in Shenzhen. The effort, jointly sponsored by Beijing Genomics Institute (Shenzhen) and 12 European research and industrial organizations, is designed to unveil the ties between human intestinal flora and obesity/intestinal inflammatory diseases. Chinese scientists will work on the following part of the project: human intestinal flora sequencing, bacterial composition, and reference genome; and studying the mutations of human intestinal flora, and analyzing their impacts on individual differences and health. The endeavor will allow researchers to understand intestinal diseases at the genome level, and unveil the role intestinal flora has played in nutrition and health, which will provide more insights for nutrition studies and diseases diagnosis/treatment.

## RESEARCH AND DEVELOPMENT

### Exact Solution to 3D Ising Lattices

Thanks to his more than a decade study, Dr. ZHANG Zhidong at Shenyang National Lab for Material Science, has worked out conjectures on exact solution to three - dimensional (3D)

simple orthorhombic Ising lattices, together with the details of calculations for a putative exact solution. The finding was published in a recent issue of British journal *Philosophy*. Zhang reports that two conjectures, an additional rotation in the fourth curled-up dimension and the weight factors on the eigenvectors, are proposed to serve as a boundary condition to deal with the topologic problem of the 3D Ising model. The partition function of the 3D simple orthorhombic Ising model is evaluated by spinor analysis, by employing these conjectures. Based on the validity of the conjectures, the critical temperature of the simple orthorhombic Ising lattices could be determined. The cooperative phenomena near the critical point are studied, and the results obtained, based on the conjectures that are compared with those of the approximation methods and experimental findings. The 3D to 2D crossover phenomenon differs with the 2D to 1D crossover phenomenon, and there is a gradual crossover of the exponents from the 3D values to the 2D ones

## A Regulator Controlling Both Rice Heading and Yield

A study team, led by Prof. ZHANG Qifa, a Chinese Academy of Sciences academician with Huazhong Agricultural University, reported in a recent issue of journal *Nature Genetics* its findings on a cloned Ghd7, an important regulator in rice for both heading and yield.

The team started to study QTL in the mid 1990s, and located a QTL, or Ghd7 that has three classes of traits determining the productivity of many crop plants. In the past 15 years, the team has repeatedly confirmed the findings. Researchers isolated Ghd7 from an elite rice hybrid, and encoded a CCT domain protein that has a major effect on a number of traits in rice, including number of grains per panicle, plant height and heading date. Study results show that the newly discovered gene is able to prolong heading date, and noticeably increase plant height and grains per panicle. In the summer of Wuhan, where the test has been made, the gene was able to postpone heading for 23 days, with an increased plant height to 30cm, and a doubled number of grains per panicle. With a strong stalk, the plant has registered a yield increase by 50%.

The study also shows that the gene is closely associated with the biological and geographic adaptability of rice species. For example, both high yield hybrid rice and wild rice species in the tropical and subtropical areas possess a Ghd7. The loss or mutation of the gene would allow rice to grow in a higher latitude area with a shorter growth period. Apparently, the gene plays a key role in increasing yield and having a better ecological adaptability.

ZHANG explains that theoretically, the quantity traits of a plant can be regulated by a dominant gene. Their finding makes a good example of a gene being a regulator with multiple traits, and creates a ground for studying the mechanism behind it. The finding will eventually be employed to increase the yield of rice production.

## A Unique Moon Rover

Hunan University made the debut of its four-wheeled Moon Rover at an international auto show recently opened in Beijing. The rover is able to run like a six-wheeled system in terms of basic driving performance, with an enhanced performance for turning, climbing, and obstacle crossing. It is so designed that the rest three wheels can make themselves a stable supporting structure in a triangle shape, when one of the wheels is spared. Installed on four swinging legs, the four wheels are able to adapt to regular road surfaces, with a steady touch. When meeting stages, or obstacles, it will be readjusted to step around or cross the obstacles using the remaining three legs. In addition, it is able to take a 360-degree turn on the spot, being free from a dead alley. The innovative Moon Rover enjoys numerous other merits, including a simplified structure, easy operation, light weight, and low energy consumption. Thanks to its 4-wheel design, it has shed off the weight of 2 wheels and 4 motors, allowing more effective payload.

## New Androgen-Receptor Modulators Found

On May 7, 2008, *Nature China* reported a finding made by WANG Mingwei and his team. In collaboration with Sichuan University West China School of Pharmacy, WANG Mingwei at the Chinese Academy of Sciences in Shanghai and co-workers have discovered a class of androgen-receptor modulators that may result in a better treatment of prostate cancer. After a high-throughput screening of 16,000 synthetic or natural compounds for their binding to androgen receptors, researchers focused their efforts on a series of non-steroidal compounds derived from 3-(phenylamino) -propan- 1- one. These chemicals interact with androgen receptors with a high affinity, thereby preventing dihydrotestosterone from binding. Binding of androgens to their receptors leads to the activation of target genes and cell proliferation. Researchers tested whether their compounds could affect such cellular processes. They found that some of the derivatives work as 'agonists', having similar biological effects as androgens, whereas other derivatives are 'antagonists', interfering with the hormones' actions.

Started in 2003, the project has been financed by Chinese Ministry of Science and Technology, Chinese Academy of Sciences, National Natural Science Foundation, and Shanghai Municipal S&T Committee. So far a number of findings derived from the project have applied for both domestic and international patents for invention.

## Fermenting for hydrogen



Prof. REN Nanqi observed in 1990 a phenomenon indicating that hydrogen producing bacteria would produce hydrogen in the course of organic waste water treatment. From that time on, REN and coworkers have worked many years to develop a technology that is able to produce hydrogen from organic waste water, while decomposing organic matters and purifying waste water. Researchers completed a limited scale experiment to extract hydrogen from organic waste water using a fermentation process in the period from 1990 to 1996. They furthered their pilot study during the period of 1996-1999, and developed a proprietary biotechnique to produce hydrogen from organic waste water. The project was financed by a National 973 Program in 2000-2005, during which a new class of strains was discovered by researchers. The new strain makes a fine catalyst in producing hydrogen, with an easy demand for environment, which makes massive production of hydrogen possible. REN and coworkers established in 2005 a fermentation based hydrogen producing line with a daily capacity of 1200 cubic meters, the first of its kind in the world, under a demonstration project financed by the National 863 Program.

NEWS BRIEFS

## 1.5 MW VSCF Wind Turbine

A 1.5 MW VSCF wind turbine, developed by Zhejiang Yunda Wind Power Co. Ltd., rolled off the production line on April 16, 2008. Applied with advanced variable speed constant frequency technologies, the new wind turbine is able to obtain a maximum energy conversion, and work under a minimized load. One can equip the turbine with the vans tailored to the site, at 70m, 77m, or 82m. With a range of elements designed for northern cold areas, including low temperature resistance, reduced air density, and wind proof, the unit is able to work under extreme weather conditions. The prototype turbine will be tested at the Zhangbei Danjinhe wind field, before escalating to mass production. The first batch of VSCF wind turbines will be delivered to a special state project for wind power generation. Yunda, a VSCF wind turbine supplier, will provide 53 units of 1.5 MW VSCF wind turbine to the project.

## Proprietary Single Screw Compressor

Prof. MA Chongfang at Beijing University of Technology and co-workers have produced 15 single screw compressors with a motor power of 37kw. Meanwhile, they have developed 12 single screw compressors with a motor power of 90kw. 2 of the single screw compressors have been installed in thermal pumps, and 1 in cold-water generators. A new project will soon be launched to demonstrate single screw technology and associated industrialization, which will eventually result in an annual capacity of 10,000 units of single screw compressor. Researchers have also been working on single screw expressors. So far they have developed molds for manufacturing single screw expressors of 10kw and 40 kW, and will roll out prototypes at the end of May.

## New Soybean Variety

A new soybean variety, Dongsheng II, bred out by Chinese Academy of Sciences Northeast Institute of Geographic Sciences and Resource Research, has recently passed an approval check. As a new soybean variety approved by Heilongjiang agricultural authorities for extensive growing, Dongsheng II grows well in the soil with a medium fertility. It can be planted in double rows in the early or mid May, with 250,000-280,000 seedlings for a hectare. In the soil with a medium fertility, it needs a chemical fertilizer consumption worth 150kg of diammonium phosphate, 50 kg of potassium sulfate, and 20 kg of urea. In the blooming period, it shall be sprayed with 7.5 kg of urea, 2.0 kg of potassium dihydrogen phosphate, and 5000 kg of water a hectare. The experiment made in 2005 and 2006 has produced a respective yield of 2373.4 kg and 2599.5 kg per hectare, or 9.8% and 11.7% higher compared with the control group Hefeng 35 and Hefeng 47. In 2007, the new soybean was registered with a yield of 2493.5 kg per hectare, or 15.4% more compared with the control group Hefeng 47.

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