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**CHINA SCIENCE AND TECHNOLOGY**

# **NEWSLETTER**

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## **SPECIAL ISSUES**

### **National Plan to Attract More Biotech Talents**

Six Chinese government agencies, including Ministry of Science and Technology, Ministry of Human Resources and Social Security, Ministry of Education, Chinese Academy of Sciences, Chinese Academy of Engineering, National Natural Science Foundation, and China Association for Science and Technology, jointly released on 26 December 2011 a medium and long term plan to attract more biotech talents

during the period of 2010-2020.

According to the Plan, China will build a biotech contingent under a strategy of "serving for the development, talented people first, recruitment oriented, mechanism innovation, focusing on high-caliber talents, and striving for an overall development", working on the combination of current and long-term needs, innovation personnel and entrepreneurship, training, importation, and recruitment, talents and projects, domestic and overseas recruitment, and the combined strength of universities, research institutions, and businesses, in a bid to foster a world-class biotech contingent made up of high caliber researchers, academic leaders, business people, and capable management, through favored government support. China will establish by 2020 a biotech personnel pyramid, making China a biotech power enjoying an impressive bio-industry, supported by a large world-class contingent of biotech personnel that is reasonably structured and scientifically distributed.

### Top Ten Domestic S&T News for 2011

The "Longliqi Cup" Top Ten Domestic Science and Technology News for 2011, initiated by the Science and Technology Daily, and jointly selected by some academicians of the Chinese Academy of Sciences and the Chinese Academy of Engineering, heads of mainstream national news media, senior S&T correspondents, and editor-in-chiefs of major news portals, have recently been unveiled. They are:

- 1) J-20 stealth fighter jet made a successful test flight;
- 2) Say No to academic frauds. China revoked for the first time a granted national science and technology award;
- 3) Three more navigation satellites have been launched to embark on an official test run of the Compass navigation system;
- 4) Chinese scientists confirmed that body cells can be directly induced to become liver cells;
- 5) China's first fast neutron reactor became part of power grid;
- 6) "Dragon" boat, a Chinese made manned submersible, for the first time hit the record depth of 5000 m;
- 7) "Chang-e II", a Chinese made moon probe satellite, reached L2 Lagrange point, allowing Chinese scientists to probe the targets in farther space;
- 8) Tu Yo Yo won the Lasker Award for preparing artemisinin;
- 9) Shenzhou-8 capsule made a successful docking with Tiangong-I, a Chinese made target spacecraft, in space; and
- 10) University of Science and Technology of China worked out an eight-photon entangled state.

## INTERNATIONAL COOPERATION

### China-Indonesia Signed for S&T Cooperation



CAO Jianlin, Chinese Vice-Minister of Science and Technology, and Teguh Rahardjo, Indonesian Deputy Minister of Research and Technology, jointly inked on 13 December 2011 an accord to work on S&T cooperation between the two countries at a China-Indonesia Science and Technology Week opened on the same day in Jakarta. The signatory parties promised to work on a wider range of scientific and technological cooperation under the framework of China-ASEAN Science and Technology Partnership.

"2011 China-Indonesia Science and Technology Week", held on 13-15 December 2011 in Jakarta, Indonesia, was designed to demonstrate advanced proven technologies and products developed by the two countries in the areas of agriculture, traditional medicine, and new energy, along with two themed seminars on traditional Chinese medicine and new energy. Representatives from some 120 Chinese and Indonesian universities, research institutions, and tech businesses attended the event.

## Robot Makes Vascular Intervention Easier

A robot, jointly developed by Chinese and Japanese scientists to work on vascular interventional surgery, made its successful clinical animal trial on 9 January 2012 through a remote control system linking Beijing and Kagawa. According to a briefing, the new system sharply cuts down the risk of a vascular intervention surgery, making the surgery more successful. WANG Tianmiao, a Chinese scientist involved in the experiment, said the design team installed for the first time a micro sensor at the end of the conduit to measure the possible collision between the catheter and blood vessels at a precision of 0.8 mm, effectively reducing the risk of surgery. Designed with a master-slave manipulator, the system can be controlled through a three-dimensional blood vessel navigation system, allowing the robot to perform vascular intervention surgery on instruction.

It took three years for the researchers from Beijing University of Aeronautics and Astronautics, Japan National Kagawa University, and Navy General Hospital to develop the robot. The project was funded by China's National 863 Program and Japanese Ministry of Education, Culture, Sports, Science & Technology with an amount of 20 million RMB.

### RESEARCH AND DEVELOPMENT

## Lunar Satellite Had More Experiments

It is reported from China Aerospace Science and Technology Group that Chang-e III, a satellite launched at phase-II lunar probe, has completed a range of experiments, including a lunar lander hovering above the moon for obstacle avoidance. Phase-II lunar probe, being implemented by Chang-e II, III and IV, is designed to cruise above the lunar surface, and pave the way for the soft landing of future moon rovers. Chang-e II is currently working at a L2 Sun-Earth Lagrange point 1.7 million km away from the Earth. Chang-e III is given the tasks to work on soft landing, lunar probe, survival on the lunar surface, deep space communication and remote control, launch vehicle directly into the earth-moon transfer orbit among others, allowing China to make the first direct contact with an extraterrestrial body.

## Unmanned Marine Helicopter

China's first unmanned helicopter developed by South China University of

Technology for maritime surveillance was recently put into operation. According to a briefing, the unmanned rotary-wing aerial vehicle needs no runway as a fixed-wing UAV does, capable of vertical takeoff and landing on a boat for maritime surveillance. The unmanned rotary-wing vehicle enjoys an enhanced endurance and wind resistance, with a maximum flight speed up to 90 km per hour and a cruising speed at 50 km per hour at an altitude up to 1,000 meters. It can fly for one hour with a 10-kg payload, or longer with an enhanced oil tank. It consumes only 10 liters of fuel per four-hour cruise. Sea trials show that the aircraft can have a safe and stable flight in strong winds up to the force of 5-6.

Researchers developed a special shock resistance mechanism for the unmanned helicopter, allowing it to take steady images. It makes autonomous flight and positioning under the guidance of satellites and its inertial navigation system, gathering aerial images and data in a real time manner, through onboard video camera, still image camera, and microwave equipment. The ground control may plan the flight of the unmanned helicopter, instructing it to collect images and playback the collected images in a real time manner.

### Laser Treatment of Erythema Mole

As part of the "solid-state laser technology and its applications", a major project initiated under the National 863 Program for the 11<sup>th</sup> Five-year period (2006-2010), the "all-solid-state laser treatment of vascular tumors and associated equipment" undertaken by the PLA General Hospital researchers has rolled out a solid-state continuous laser device for treating Erythema mole, the first of its kind that has passed technical acceptance check in the country.

Researchers from PLA General Hospital Division of Laser Medicine and Beijing Xinrunxin Laser Technology jointly developed the laser device, in line with the principle of photodynamic therapy and the evolution of PWS lesion. The laser device produces stable output with uniform beam quality, desirable for clinical applications. It has reached an advanced level among the similar products manufactured both at home and abroad. With the approval of SFDA, the device has been tested in more than 2,000 clinical cases, enjoying a 100% efficacy.

### Potato Starch Wastewater Utilization

Not long ago, Chinese Academy of Sciences Lanzhou Institute of Chemical Physics landed an important progress in utilizing wastewater discharged from potato starch processing as a resource. Researchers developed two special highly efficient and low-cost clay-based flocculants to utilize the wastewater discharged from potato

starch processing. The reverse flocculation-ultrafiltration separation device developed by the researchers is able to recover protein from wastewater, and make it a resource that can be further utilized, with a chemical oxygen demand removal rate up to 80%, and a turbidity removal rate at 85% or more. The wastewater treated through the device complies with the national grade-III standard for waste water emission and resource oriented utilization, and can be directly used for irrigation and washing raw potato before starch processing. The reverse filter invented by researchers works on the concentration of floc solution while keeping the discharge of filtered water for continuous dehydration, recovering crude protein with a water content around 70%.

The new technique expects to bring more economic, social and ecological benefits. For example, a potato starch processing business with an annual capacity of 80,000 tons may recover 13 kg per ton of crude protein from wastewater, with an added output value worth RMB 9.36 million, in addition to 70,000 tons of water saved, and an eliminated potential environmental pollution equivalent to 80,000 tons of wastewater.

## NEWS BRIEFS

### Medical Award Winners Unveiled

Chinese Medical Science Award (2010-2011) unveiled its winners on 7 January 2012 in Beijing. 166 research findings were honored with the Award. 15 findings, including "Cellular and molecular mechanisms of glioma angiogenesis" stood in first place, and 51 others, including "Severe underweighted bone implant technique and associated clinical applications", in second place, with 93 other findings, including "Clinical progress of treating acute respiratory distress syndrome", in third place, and 4 studies, including "China AIDS monitoring and evaluation system and associated implementation strategies", in fourth. Two research projects, including "Teenagers drug abuse and associated education" won the awards for diffusing popular medical knowledge. JIANG Jiaqi with the University of Wisconsin School of Medicine Department of Otolaryngology won the Award for International Science and Technology Cooperation.



### Integrated Energy System

A national demonstration project, jointly initiated by the National Science and Technology Support Program and the Golden Sun Demonstration Program to store different forms of energy in a manageable manner, was put into operation on 25 December 2011 in Zhangbei, Hebei Province. With the support of the Ministry of Science and Technology and Ministry of Finance, the State Grid Corporation developed five major technologies, including co-generation complementary mechanism and associated system integration, panoramic monitoring and coordinated control, power prediction, source network coordination, and large-scale energy storage, in a bid to make new energy part of power grid. It established a "four in-one" new energy demonstration power plant, the first of its kind in the world, placing wind power, photovoltaic power, energy storage, and smart transmission under one roof. Phase-1 part of the project is supposed to produce 100MW of wind power and 40MW of photovoltaic power, and store energy equivalent to 20MW, in addition to building a 220kV smart substation, under an investment package worth RMB 3.226 billion.

### Advanced Sodium Heat Pipe

A proprietary gas-controlled sodium heat-pipe system developed by China Institute of Metrology recently passed an expert panel check organized by the General Administration of Quality Supervision, Inspection and Quarantine. The Institute has

worked on the gas-controlled sodium heat-pipe since 2007, and rolled out China's first proprietary gas-controlled sodium heat-pipe system. Researchers proposed a new strategy to work on both high-precision pressure control and temperature control, in a bid to achieve the high precision repetition of the temperature stemmed from a gas-controlled sodium heat-pipe system, noticeably enhanced temperature uniformity and the stability of technical indicators. At a dynamic pressure of 111250Pa, the thermometer well of gas-controlled sodium heat-pipe produces a vertical temperature uniformity and stability up to  $\pm 0.16\text{mK}$  and  $\pm 0.21\text{mK}$  respectively, an international leading level. Before this, the highest temperature uniformity and stability a gas-controlled sodium heat-pipe could reach was secured by the Italian Institute of Metrology at  $\pm 0.5\text{mK}$ .

### Low Rank Coal Methane Utilization

China has for the first time landed a range of breakthroughs in recovering and utilizing methane from low rank coal (lignite), multiple layer, and fracturing thin coal beds. In 2009, Yanbian Yaotian Group in Jilin worked with a CBM Research Center in Shenyang to develop the key technologies for tapping up the methane resources in low rank coal beds. Researchers gathered a huge amount of data on coal-bed geology, coal-bed methane, regional geological background, coal-bed geological conditions, coal reserves among others, and drilled up two production and test wells at the Huichun Coal Mine in Jilin to collect the needed technical data.

Researchers developed an optimized perforation technique for different densities and a pressure diverting fracturing technique, applicable to low rank, multiple layer and fracturing thin coal-beds, in line with the local geological conditions. The operational trials at three wells at the Huichun Coal Mine show that one can recover 3,000 cubic meters of methane a day from a single well using the technique.

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