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SPECIAL ISSUES

Enhanced Water Contamination Control

Water contamination control technologies and associated projects, one of

the 12 major national special projects implemented during the 10th Five-year period(2001-2005), has worked on a range of key S&T issues concerning water contamination control, in an attempt to curb up the further deterioration of China's water environment.

In the area of lake contamination control, a number of technical solutions have been found to address source water control, and reconstruction of heavily contaminated water systems. An integrated lake surface contamination control system was introduced in the Taihu Lake facelift project. A preliminary fresh water lake contamination control system has also been established, and a set of technologies and management plans produced.

To improve the urban water environment, 11 typical cities, including Wuhan and Suzhou, were selected to serve as role models for urban water environment control, making such control an independent process. The efforts has resulted in a range of urban water environment control technologies and management plans suitable for diversified cities.

In the area ensuring the safety of drinking water, a number of cities in the South, the North, and the Taihu Lake valley, including Shenzhen, Tianjin, and Shanghai, were selected to reflect typical drinking water needs of the country. Derived from the study are a line of key technologies concerning drinking water improvement, enhanced regular processing, disinfections, and safety assessment. The efforts also resulted in 3 safe drinking water demonstration projects, with a daily capacity of 200,000 tons or above, and a technical support system for urban drinking water safety.

Aiming at international cutting-edges and China's potential demands for water contamination control, a range of proprietary functional materials and innovative water treatment reactors were developed, including highly effective bacteria agents, nano-flocculant, molecular print absorbant, PE fiber pore membrane, aerobic reactor, anaerobic reactor, membrane bioreactor, and microwave plasma reactor. Of them, the nano-flocculant has been put into commercial applications, and exported in large volume.

New Projects for SMB

Under the guidance of an interim regulation on technology innovation funds for S&T oriented small and medium-sized businesses, the Chinese Ministry of Science and Technology and the Ministry of Finance has completed the review and approval of the first round of projects that will become the beneficiaries of the SMB Fund in 2006. Reviewed and assessed by a group of experts and institutes organized by the SMB Fund Management Center, a

part of the Ministry of Science and Technology, 601 projects are approved, with a planned budget worth RMB 212.53 million, covering diverse areas, including electronics and information, biopharmaceuticals, advanced materials, machinery-electronics ensemble, new energy, and environmental protection.

To further enhance the openness and fairness of the Fund, and place the Fund under the public scrutiny, the Fund is also designed with a disagreeing mechanism for project approval, which allows different views or comments on the project within four days after it is publicized, in an attempt to collect different views or complaints about the project from all walks of life. Please see details at

http://www.innofund.gov.cn/innobull/pub_list.asp?CYear=2006&CNum=1.

INTERNATIONAL COOPERATION

China-US Builds New Rural Areas

A China-US seminar on promoting the development of new rural areas through S&T cooperation, co-sponsored by the Chinese Ministry of Science and Technology, and China Agenda 21 Management Center, was held on June 13, 2006, along with the second plenary session of the Joint Council of China-US Sustainable Development Center. Participants had an in-depth discussion of promoting the development of new rural areas through international S&T cooperation, in addition to routine discussion and work summary. Some 80 participants from the Ministry of Science and Technology, the Ministry of Land and Resources, the Ministry of Construction, the Ministry of Education, the State Environmental Protection Administration, Chinese research institutes, universities, and large enterprises, and from the US Association for Chemistry, Intel, GE, and International Sustainable Development Fund, were present at the event.

The Chinese Chairman of the Joint Council made an introduction of China's status quo in implementing the philosophy of scientific development, cyclic economy, building an innovation oriented country, and promoting the development of new rural areas. In addition to highlighting the importance of exchanges and cooperation in the area of sustainable development between the two nations, he also thought highly of the accomplishments made in the past few years, wishing a further enhanced collaboration in interesting areas and demonstration projects, based on the principle of "practicality, efficiency, and mutual benefit".

In the meantime, council members of both nations reviewed the progresses

made at the center, and discussed major development directions and priority fields for future cooperation. They also proposed to combine the advanced concept of sustainable development with daily practices, advocating the combination of government guidance and industrial participation, and the combination of demonstration and S&T finding diffusion, in an attempt to enhance cooperation and exchanges between the two nations in the area.

China-UK Seminar on Clean Energy

A China-UK seminar on clean energy policies, jointly sponsored by a number of Departments under the Chinese Ministry of Science and Technology, including the Department of High and New Technology Development and Industrialization, the Department of International Cooperation, and the Office of Emerging Energy Technologies, a part of the UK Department of Trade & Industry (DTI), was held June 13-15, 2006 in Xiamen. The event, the first of its kind in cooperation between the two nations, is an important joint action defined by a memorandum of understanding on energy science and technology, inked on November 2005 by both XU Guanhua, Chinese Minister of Science and Technology, and Lord Sainsbury, Minister for Science and Innovation, within the DTI in London. Some 70 representatives from government, S&T communities, and energy industry of both nations attended the meeting. At the meeting, a range of topics were discussed, including energy policies, clean coal utilization, efficient power generation, development and application of renewable energy technology, hydrogen energy and fuel battery technology, and greenhouse gas emission reduction, including CO₂. The exchange of views deepens mutual understanding, and facilitates the collaboration between the two sides.

During the meeting, FENG Jichun, Director of High and New Technology Development and Industrialization, and Ms Bronwen Northmore, Director of Emerging Energy Technologies, DTI undersigned two cooperation accords, concerning coal burning trace gas control technology, and underground gasification technology. Both sides agreed to work on a number of topics having mutual interests, including CO₂ capture and sealing, and hydrogen making and storage.

Joint Efforts for New Fiber Making Technology

Study of GI POF rods and associated commercial applications, a cooperative project jointly undertaken by Chinese research institutes and an Australian photon research center, has rolled out an MCVD+OVD rod making technology, combining both the MCVD rod manufacturing technique and

OVD rod wrapping technique, which filled up a domestic blank.

The project resulted in an internationally unique MCVD+OVD rod making technology, based on the state-of-the-art GI POF rods making technologies and concerted efforts of scientists from the two nations. The GI POF rods, telecommunication fibers, and polarization maintaining fibers produced by Chinese manufacturers have reached the same advanced level as their overseas counterparts. The project also led to the establishment of a GI POF rod and optical fiber manufacturing base of international competitiveness, with a number of intellectual properties, including 13 patent applications, one national standard, and one monograph.

The implementation of the project enhances the GI POF rod manufacturing capability of domestic enterprises, and facilitates their products into both domestic and overseas markets. The efforts also found solutions to addressing the bottleneck issues restricting the domestic telecommunication industry, as a result of lacking proprietary products in the area, and effectively raised the international competitiveness of the entire industry.

RESEARCH AND DEVELOPMENT

Digital Color Ultrasound Technology

Not long ago, the full digital color ultrasound technology and associated system, a project initiated under the National 863 Program, passed an approval review. The project has worked on a range of related technologies, including broad frequency band energy conversion, digital wave maker, high-speed real-time digital signal processing, color blood stream imaging, Doppler spectrum analysis, and PC based accuracy control system. Researchers have worked out a system design feasible for lower cost but higher quality, based on the state-of-the-art findings in microelectronics and computer software and hardware. They established a full digital color ultrasound imaging system, using FPGA components in the PC hardware. The efforts has led to a proprietary full digital color Doppler diagnosing system tailored to the China's own needs, with a high cost/effect ratio.

The successful development of the new color Doppler diagnosing system is of importance to raising China's capability of developing and manufacturing ultrasound equipment, breaking up the monopoly, and noticeably lowering down the price of medical ultrasound equipment, which will in turn ease heavy medical bill burdens of patients, and benefit more people.

Commercial Applications of Biochips

With the support of a national special project involving functional genome and biochips, China has witnessed a fast development of biochip technologies and associated products, reaching a preliminary industrial scale. Up to date, Chinese scientists have rolled out more than 200 biochip products on a combined basis. Of them, 6 chips and associated equipment have been granted with new drug certificates, or medical equipment certificates. For example, Shenzhen Yishengtang is granted with new drug certificates and production permits for hepatitis C protein test chip (GUOYAOZHENGZI S20020034), HLA-DRB1 genetic chip (GUOYAOZHENGZI S20050071 and GUOYAOZHUNZI S20050085), and YMDD hepatitis B variants test chips (GUOYAOZHENGZI S20050072, and GUOYAOZHUNZI S20050086). Others include multi-cancer marker protein test chips by Shanghai Shukang Company, the Mediterranean anemia test chip by Jiangnan Biotechnology Corp., and mini-array chip scanner by Beijing Bo'ao Corp.. Tianjin Taida Biochips Co. Ltd. has rolled out a line of products, including Bactarray™ test chip for major blood diseases, Bactarray™ test chip for Z-H Bacilli genes, and Bactarray™ test chips for intestinal bacteria genes, and Streptococcus P. test chips. The company has developed a trial daily capacity of 130 packets (one packet for four persons), and a bulk production capacity for 3000 person/bulk. All the test chips have entered clinical studies.

The efforts has resulted in 9 findings honored with awards at the national or provincial levels. The chip scanner, produced by Bo'ao Corp. has been exported to the EU, and the US, with most of its products granted with ISO9001, ISO13485 and CE certificates. The company has been listed among top 100 non-listing Asian companies in the year, for a sale revenue worth RMB 200 million, and technology transfer and export approaching RMB 70 million.

High End Programmed Machine Tool

A high end programmed machine tool system, with diverse functions, including sampling, jumping-in-the-queue, and joint action of three, four, or five axes, developed by the Beijing Jiaotong University, made its recent debut at the 06' China International Machine Tool Show.

With numerous merits, including full functions, fine processing quality, and high efficiency, the new system is of a proprietary intellectual property. In addition to meeting the needs for joint actions of multiple axes, and consecutive long time operation in an industrial environment, researchers also developed a range of innovative functions, including intelligent

algorithms for small bits and sampling, a constant feed-in of work surface under a joint action of multiple axes, and accelerated gripping. The new functions have noticeably raised the quality of processed objects and the efficiency of processing.

Computer for Rough Environment

16RCPCPM computer, a reinforced calculating system developed by the No. 716 Institute, a part of the China Shipbuilding Group, to stand rough environments, passed an approval review on June 14, 2006. The new computer hardware enjoys a noticeably raised speed, with a power consumption 50% less than the computer running at the same speed, under a controlled power and ventilation setting.

Taking full advantage of the prevailing commercial computation technologies, the Intel Centrino based system embraces a range of advanced technologies, including high speed Ethernet at the giga-level, PICMG2.16 CompactPCI Packet Switching Backplane, and high speed CAD design. It works at low power consumption and high speed, with a mainframe frequency approaching 1.1G-1.4G HZ. It can work reliably for a long period of time, in a rough environment with strong electromagnetism. The system makes a fundamental solution to a range of problems encountered by the reinforced computer system, including slow running speed, or large power consumption for a faster speed, and abruptly raised heat output. Thanks to prevailing commercial computer technologies it used, the system has a fine compatibility with other systems.

Numerical Model for Wind Resources

On June 14, 2006, China's first numerical model for assessing wind energy resources was put into operation. The system will provide detailed evidences for the survey of wind resources, and site selection for wind power generators. It also makes real-time meteorological watch and prediction for the construction, operation, and dispatch of wind power stations.

The system is a cooperative project between the China Meteorological Administration and the Canadian Weather Services. Starting from the early 2005, Chinese scientists have worked on the Chinese version of the model, based on a wind resources numerical model imported from Canada. Thanks to a year effort, the Chinese system was eventually put into operation.

It can collect the data showing the wind resource distribution from a 30-m level to 120-m level, while the conventional wisdom only allows a 10-m level assessment. Researchers at the Wind and Solar Energy Assessment Center,

a part of the China Meteorological Administration, are currently working on a nationwide wind resources chart with a resolution of 5 km, using the system and re-analyzed data of the global circulation model. So far, the parts of northeast China, Inner Mongolia, and some areas of Xinjiang have been completed.

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