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# NEWSLETTER

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SPECIAL ISSUE

## WAN Attended China-US Dialog

WAN Gang, Chinese Minister of Science and Technology, attended, as part of the Chinese delegation, the second round of the China-U.S. strategic and economic dialogues opened on May 24, 2010. At the meeting, WAN spoke about collaborations between the two countries in the areas of energy, environment, and climate change.

WAN told audiences that the Chinese Ministry of Science and Technology (MOST) has in recent years promulgated a range of policies and regulations to facilitate the development of science

and technology, including the renewable energy law, an outline for China medium and long term S&T development planning (2006-2020), a comprehensive work plan for energy efficiency and emission reduction, a special action on adaptation to climate change impacts, and the medium and long term development plan for renewable energy. MOST has also published an international cooperation plan for renewable and new energy, in collaboration with other government agencies including the State Development and Reform Commission. MOST has kicked off an array of pilot projects to promote commercial applications of new energy, taking advantage of the financial subsidies offered by the government, including a campaign to introduce a thousand electric automobiles in ten major cities, a Golden Sun project to diffuse photovoltaic technology and products, and a semiconductor illumination project to introduce energy saving illumination systems in ten major cities. The efforts have positively spurred up the scale application and associated commercial applications of new energy autos, solar energy, wind energy, biomass energy, and semiconductor illumination.

WAN pointed out that energy collaboration between China and the United States has long been a priority in the S&T cooperation between the two countries. MOST has signed a range of accords with US Department of Energy, to work on nuclear physics and magnetically confined fusion, fossil fuel energy, and renewable energy. The two countries have witnessed laudable accomplishments made in the areas of power generation system, cleaner-burning fuels, oil and natural gas, energy and environment, climatology, and electric automobiles. The heads of two countries met in November 2009, and issued a joint statement, in which both sides thought highly of the progresses achieved in S&T cooperation between the two countries in the past 30 years. Senior officials of Chinese Ministry of Science and Technology, National Energy Administration, and US Department of Energy have jointly inked a protocol to study clean energy, the first research program initiated by the two governments to finance the collaborations between industry, universities, and research institutes in both countries.

WAN also expressed that China is willing to work with the United States Government, exploring possible new collaboration areas, and deepening the cooperation in the area of energy and environment. Based on the successful collaborations in the area of clean energy, both sides will work together to establish joint research centers or labs in the areas of agriculture, health, and environment, making them important platforms for exchanges and cooperation between S&T, industry, and academic communities in the two countries.

INTERNATIONAL COOPERATION

WAN Met with American Guests



WAN Gang, Chinese Minister of Science and Technology, met with Dr. John P. Holdren, Assistant to the President for Science and Technology and Director of the White House Office of Science and Technology Policy and his party at the Diaoyutai State Guesthouse on May 24, 2010. WAN welcomed Dr. John P. Holdren's second visit to China, and thought highly of his efforts in promoting cooperation and exchanges between the two countries in the area of science and technology. WAN proposed that efforts shall be made to establish joint research centers or labs in the areas of agriculture, health, and environment, following the successful example of China-US joint lab for clean energy, making them an important platform for exchanges and cooperation between S&T, industry, and academic communities of the two countries. Dr. John P. Holdren endorsed the proposal made by WAN, and briefed the other side of the major highlights of Strategy for American Innovation published last year. He also expressed his hope to further enhance the collaborations with China in the areas of space research and terrestrial observation. Both sides also exchanged views on innovation policies.

### Special Gene for High Altitudes

A joint team, made up of the scientists from Qinghai University Medical School and University of Utah School of Medicine in Salt Lake City, has for the first time identified two genes that appear to explain why Tibetans are able to live comfortably in rarefied air at very high altitudes. The finding was reported under the title "Genetic Evidence for High-Altitude Adaptation in Tibet" in the May 14, 2010 issue of the journal *Science*.

To find out if Tibetans are genetically built to have an easy adaptation to high places, scientists analyzed the genes of 31 Tibetans who were unrelated to each other living at a site 4,350m above sea level in Qinghai Province. Scientists also compared the data to the DNA of Chinese and Japanese individuals living in the low-lying areas collected under a HapMap project. Results show that two genes — EGLN1 and PPARA have turned up consistently, compared with the people living in the low-lying areas. In a paper published in the recent issue of journal *Science*, scientists believed that the two genes inhibit the production of blood hemoglobin, making Tibetans unusually low in blood hemoglobin levels, which partially explain their adaptation to

high altitudes.

## Activating Dormant Follicles

A study team, made up of the scientists from Chinese Academy of Sciences Institute of Zoology, Stanford University School of Medicine, and Akita University School of Medicine, has successfully activated the original follicles in mouse ovaries using an artificial means, and collected matured eggs to produce healthy progeny. The finding was published in the recent issue of The Proceedings of the National Academy of Sciences.

In the experiment, researchers took out the ovaries from the neonatal mice that had been born for three days, and cultured the ovaries in a nutrient solution added with the chemicals that facilitate the cell divisions in the original follicles for one or two days. They transplanted the activated follicles under kidney capsules of ovariectomized hosts, and obtained matured eggs in 18 days. The treated eggs, once married with the sperms, were developed into healthy baby mice. It is believed that the innovative technique can be used to treat human infertilities in the future.

## Joint Lab for Sustainable Aviation Biofuels

Boeing inked on May 25, 2010 an accord with CAS Qingdao Institute of Bioenergy and Bioprocess Technology to establish a joint lab, speeding up the study of microalgae biofuels for aviation industry and associated commercial applications. Under a name of Joint Lab for Sustainable Aviation Biofuels, the new research center will be jointly financed and governed by Boeing and Qingdao Institute of Bioenergy and Bioprocess Technology. Both sides are confident that the collaboration will render a more efficient and timely support to developing biofuel raw materials and associated novel processing techniques.

RESEARCH AND DEVELOPMENT

## High Yield Rice Gene Cloned

With the support of the Chinese Ministry of Agriculture, Ministry of Science and Technology, and National Natural Science Foundation, a team, led by LI Jiayang, a CAS academician and research fellow at CAS Institute of Genetics and Developmental Biology, and QIAN Qian, a research fellow at the Chinese Academy of Agricultural Sciences Institute of Rice, has successfully cloned a major high yield gene named IPA1 from a desired rice species. Researchers found that the mutation of IPA1 would result in the reduced rice tillering activities, but in an increased thousand-grain-weight. Meanwhile, the rice stalk would become thick and

stout, resistant to lodging. Experiments show that regular rice species, when implanted with the mutated gene, will be able to claim a yield increase by 10% or more. The finding was published in the recent issue of *Nature Genetics*.

## Supercomputer Exceeding Petaflop Level

Nebula, a supercomputer with a measured speed exceeding the petaflop level, recently made its debut at the premises of DAWNING. Enjoying broad applications in the areas of scientific computation, intelligent online search, and DNA sequence, the new supercomputer will be delivered to the National Supercomputer Center in Shenzhen at the end of the year.

According to LI Jun, President of DAWNING, X86 processors were installed in one of the two major sub-areas of the new high performance petaflop supercomputer named DAWNING 6000. The sub-area is made up of some 60,000 generic processors and nearly 5,000 GPGPU accelerators, allowing a peak performance approaching 3 petaflop floating-point operations per second, and a measured LinPack performance up to more than 1 petaflop operations per second. The new computer is designed with a measured speed faster than the first petaflop supercomputer Milky Way I in the country. Physically located in the Binhai New Area, Milky Way I has a measured LinPack speed at more than 500 trillion floating-point operations per second.

## 'Big Mac' Cylinder Battery

Not long ago, Tianjin University and Beijing Tianlu Energy successfully rolled out a 'Big Mac' lithium-ion battery (400Ah) in cylinder shape. According to Prof. TANG Zhiyuan, head of the project at Tianjin University, the battery's 400Ah volume makes it the largest cylinder shaped fuel battery in the world. At the present stage, the fuel batteries used in electric automobiles are mostly the combination of a thousand small batteries at a volume of 10Ah. The connection of those small batteries would ask for a very sophisticated battery management system and control system, increasing the potential safety problems of the batteries. The 'Big Mac' battery makes a solution to the bottleneck problem. It takes only 200 'Big Mac' batteries to drive an electric car, with reduced control sophistication and raised safety and economic performance.

According to a briefing, the innovative batteries are built with LiFePO<sub>4</sub> and lithium titanium oxide electrodes, which enhances the safety performance of the batteries and cuts down the possible explosion caused by overcharging, high temperature, short-circuit, and collision. The novel battery has a coat made of stainless steel, with enhanced heat conductivity, and radiation/pressure/ collision resistance. The battery has a recycle life reaching 8,000 times or more, or 2-4 times that of a regular lithium battery. The 'Big Mac' batteries have been put into limited production, and expect an official bulk production next year at a national economic and technological park in Jinzhou.

## High Performance Polypropylene Alloy

Thanks to more than 3 year's painstaking efforts, the Changchun Institute of Applied Chemistry, part of the Chinese Academy of Sciences has, in collaboration with the China National Petroleum Corporation, produced a high performance polypropylene alloy using the proprietary polypropylene catalyst as an electron donor. The proprietary phosphorus esters developed by Chinese researchers has freed China from using the patented aromatic ester, fatty ester, or ether compound as an electron donor. Researchers developed a range of technologies and techniques to prepare high performance polypropylene alloy through readjusting the structure of phosphorus esters, copolymer performance of catalysts, the chain structures of polypropylene alloy, the structure of particle physical piles, and the structure/rigidity/elasticity of aggregation. The phosphorus esters based catalyst as an electron donor, invented by Chinese researchers, has reached the level of commercial applications in terms of the required indicators. Having applied for 2 Chinese patents and 1 US patent, the project has created a solid foundation for commercial applications of high performance aggregated polypropylene products.

## China's First IR-UWB Network

Researchers at the University of Science and Technology of China have recently established an IR-UWB communication system and associated online application demonstration, the first of its kind in the country. The system has passed experts' approval. In 2007, a wireless communication lab under the University of Science and Technology of China was assigned to work on the design of UWB SoC chip and associated networking. Thanks to 3-year efforts, researchers developed IR-UWB technologies and associated special integrated circuits, staged IR-UWB access application demonstration, and completed online integration. They rolled out a receiver able to receive IR-UWB signals, and associated core chips. Researchers also developed a low precision signal switch approach tailored to IR-UWB signals, greatly improved the reception of IR-UWB signals, and reduced power consumption of the system. The findings were published in the recent issue of *IEEE Trans. on Communications* and *IEEE Trans. on Wireless Communications*.

## Hand-foot-mouth Test Kit

EV71 IgM and IgG test kits, jointly developed by China Diseases Prevention and Control Center, ABO, and Beijing Beier Biotechnology to diagnose the hand-foot-mouth diseases (HFMD), has recently won the permit of China State Food and Drug Administration to commercially produce the test kits, the first of its kind in the country.

The EV71 IgM test kit is designed to diagnose the hand-foot-mouth diseases in the early stage. It is able to produce a quick result in one hour when testing the children who have been infected

by the viruses for two days. The EV71 IgG test kit can be employed to test the patient who has been infected for a long time, or was infected in the past, mainly for epidemics investigations and vaccine evaluation. The innovative test kits can be easily operated without special equipment, desirable for extensive diffusion.

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