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INTERNATIONAL COOPERATION

China-UK Joint S&T Lab

A China-UK Joint S&T Lab opened on November 8, 2007 at the Beijing University of Aeronautics and Astronautics (BUAA). Under the co-sponsorship of BUAA National S&T Lab and Rutherford Appleton Laboratory, the new lab will mainly work on sun-earth environment, micro/nano satellite based distributed probe, deep space probe, and payload technologies.

Jointly operated by Beijing University of Aeronautics and Astronautics and Rutherford Appleton Laboratory, under the guidance of both civil aviation authorities of China and UK, the new lab will combine the space research efforts of institutes, universities, and industry of two nations, working on a range of sophisticated space technologies. It will be part of the efforts to strengthen S&T cooperation between the two nations, focusing on establishing a long term and stable exchange platform for technical personnel, and on exploring a new mechanism for space technology cooperation between the two nations.

China-Spain S&T Forum

As part of the activities of Spain Year and China-EU S&T Year, the 2nd China-Spain S&T cooperation forum and a show of technologies and products were held from October 31 to November 1 2007 in Tianjin Binhai New Area.

Jointly sponsored by the MOST Department of International Cooperation, Tianjin Municipal S&T Committee, Tianjin Economic-Technological Development Area, and Andalucia's Agency of Innovation and Technologies in Enterprise, the forum discussed a range of important issues, including S&T innovation, construction of S&T parks, energy and environmental protection, IT and telecommunication, advanced manufacturing, modern farming, and biotechnology. The forum and associated show is a promotion to S&T cooperation between China and Spain.

New Efforts for Protecting Wild Panda

Under the guidance of UNESCO, China will launch a wild panda watch program starting from the late November at a panda habitat located in Ya'an Sichuan. Local government has established three field watch stations to monitor and protect panda in the wildness.

Officials from Sichuan Ya'an World Heritage Office told the audiences at the 3rd World Heritage Conference held on November 7, 2007 that the watch stations would monitor panda's activities using GPS system, collecting relevant data to establish a database for the purpose. The watch stations will also collect scientific data on other rare species, including lesser panda and snub-nosed golden monkey, in an attempt to understand the ecological chains of the entire habitat. Now researchers are working on the training and equipment installation part of the project. The watch stations will be put into operation at the end of the year.

Fudan-Harvard Cooperation

Fudan University and Harvard University jointly established on October 20, 2007, a Fudan-Harvard Medical Anthropology Collaborative Research Center. Under the financing and guidance of both Harvard Yenching Institute and Harvard University Fairbank Center for East Asian Research, the new center will mainly work on collaborations and exchanges in the area of medical anthropology, through sponsoring international seminars, staging training, and literature translation and writing.

RESEARCH AND DEVELOPMENT

10 Minutes: Limit for a Hypoxic-Ischemic Brain

Prof. JIANG Jiyao of Shanghai Jiaotong University Renji Hospital, in collaboration with a research team led by Prof. XU Wei at Kunming Medical School No. 2 Hospital, has confirmed a technical fact that a monkey's brain that has been kept in a hypoxic-ischemic state for 10 minutes can survive for a long time with a normal bran and behavior function, if the brain is kept at a low temperature for 60 minutes, before restoring the normal supply of blood. However, the same hypoxic-ischemic brain could suffer a high disability, if the hypoxic-ischemic state lasted for 15 minutes, before being kept at a low temperature for further treatment. When the hypoxic-ischemic state reaches 20 minutes, the monkey's brain won't have any chance for survival. This means the limit for a hypoxic-ischemic brain is 10 minutes, if a meaningful recovery is expected.

10 years ago, the same group of researchers had tried the same technique on dog's brain. They started to work on quadrumana's brain starting from 2002. Under a design, they sealed off all the blood vessels in the monkey's brain under a normal temperature. At the same time, they allowed a carotid artery and vein to be connected with an extracorporeal circulation apparatus. They injected the Ringer's injection into the monkey's brain under a temperature of 4℃, when the hypoxic-ischemic state reached 10 minutes. The process was continued until the brain temperature dropped to 16℃, though the body temperature remained at a normal range. One hour after the brain was "frozen", researchers resumed the blood supply to the brain until a normal bran temperature was reached. The monkey came to life, when its bran temperature became normal.

Thymocytes Study

Prof. CHEN Weifeng, with Peking University Health Science Center, in collaboration with the researchers of the Walter and Eliza Hall Institute of Medical Research, has validated a developmental program they proposed for CD4SP medullary thymocytes, and explored the mechanisms regulating this process. Researchers believe that a precise dissection of this program should facilitate further inquiry into the molecular mechanisms governing normal thymocyte development and its disturbance in pathological conditions. The finding was published in the November 13 issue of the *Proceedings of the National Academy of Sciences*.

Researchers found that during mouse ontogeny, the emergence of different subsets of CD4SP thymocytes followed a strict temporal order from SP1 to SP4. Parallel to the transition in surface phenotype, a steady increase in function was observed. As further evidence, purified SP1 cells were able to sequentially give rise to SP2, SP3, and SP4 cells in intrathymic adoptive transfer and in culture. Notably, the development of CD4SP cells in the medulla seemed to be critically dependent on a functionally intact medullary epithelial cell compartment, as both Relb and Aire deficiency were found to cause severe blockage at the transition from SP3 to SP4.

Silencing Plant Insects Using Biotechnology

CHEN Xiaoya, an academician, and Dr. MAO Yingbo, both working for the Institute of Plant Physiology and Ecology under Chinese Academy of SciencesShanghai Institutes for Biological Sciences, have recently landed a breakthrough in silencing plant insects using biotechnology. They have rolled out an RNA technique that can effectively and specifically inhibit the gene expression of cotton bollworm, curbing their growth. The finding was published in the recent issue of the journal *Nature Biotechnology*.

Researchers found that when larvae are fed plant material expressing double-stranded RNA (dsRNA) specific to *CYP6AE14*, levels of this transcript in the midgut decrease, and larval growth is retarded. They identified a cytochrome P450 gene (*CYP6AE14*) from cotton bollworm (*Helicoverpa armigera*), which permits this herbivore to tolerate otherwise inhibitory concentrations of the cotton metabolite, gossypol.
As a glutathione-*S*-transferase gene (*GST1*) is silenced in *GST1* dsRNA－expressing plants, feeding insects with the plant material expressing dsRNA can be a general strategy for triggering RNA interference, and find applications in entomological research and field control of insect pests.

SENP1 Study

CHENG Jinke, Shanghai Jiaotong University School of Medicine published his findings on the functions of SENP1 in the November 2 issue of the journal *CELL*. The finding has attracted the attention of the international medical community, as it creates a potential application for tumor diagnosis and associated prevention and treatment.
CHENG and his team investigated the phenotypes of mice lacking SENP1, and found that SENP1?/? embryos show severe fetal anemia stemming from deficient erythropoietin (Epo) production. They determined that SENP1 controls Epo production by regulating the stability of hypoxia-inducible factor 1α (HIF1α) during hypoxia. These results show that SENP1 plays a key role in regulating the hypoxic response through regulating HIF1α stability, and that SUMOylation can serve as a direct signal for ubiquitin-dependent degradation.

More and Better Microspheres

The latest issue of *Advanced Functional Materials* has reported as a cover story the latest progresses Chinese scientists have achieved in synthesis and hierarchical assembly of hollow Cu_2O microspheres. Before this, a study team led by ZHU Qingsha, a research fellow of Multiphase Reaction Laboratory under Chinese Academy of Sciences Institute of Process Engineering, had landed phase progresses in the study of microstructures of amino acids regulating materials. Based on the preceding findings, the study team worked on the regulating process of Cu_2O microstructures. By changing the proportions of Cu^{2+} and amino acids, and associated synthesizing conditions, researchers realized an array of Cu_2O microstructures, including nanoparticles, solid microspheres, hollow octahedron, hollow 12-facet object, and multilayered hollow microspheres.

Researchers found that the Cu2O microspheres obtained are of a better sensitivity to alcohol, and can be used to fabricate a gas sensor. In the context of microstructures regulating, it can achieve a high output of multilayered hollow Cu_2O microspheres in a homogenous size, through optimizing synthesizing conditions. The paper has been thought highly by the commentator, and was published as cover story.

Enhanced Performance of MgB2 Tapes

Not long ago, a study team, led by MA Yanwei at the Superconductor Lab of CAS Institute of Electric Engineering, in collaboration with WEN Haihu, a researcher of CAS Institute of Physics, and Prof. K Watanabe of Japan Northeast University, has made a range of new progresses in studying the preparation of MgB_2 tapes, and associated performance. Researchers employed different commercial atomized spherical magnesium powders and different purities of amorphous boron powder, which greatly

enhanced critical current density of MgB_2 (10800A/cm², 4.2K, 12T) and rolled out a number of internationally advanced high performance MgB_2 tapes. The finding was published in both *Superconductor Science and Technology* and *J.Appl. Phys* .

Researchers found that when using the 10-micrometre magnesium as precursor powders, the Mg reacted with boron more uniformly and quickly, thus the uniformity of the fabricated MgB2 was improved and the grain size of the MgB2 was decreased, and hence the significant critical current density (Jc) . Researchers also pointed out that raising the superconductor connectivity is an important link in enhancing the performance of MgB2. The finding was published in *Applied Physics Letters*.

NEWS BRIEFS

New Composting Technique for Urban Sludge

Chinese Academy of Sciences Institute of Geographic Sciences and Resource Research has recently developed an advanced technique that can automatically compost quality fertilizer in a fast manner. It can be used to compost urban sludge, animal wastes, and living garbage, without causing pollution. It reduces the cost for composting quality special fertilizers for the production of grains, vegetables, grass, and flowers, with a high content of organic elements.

Thanks to more than a decade painstaking efforts, researchers of the Institute have developed a complete process for the new composting system that can be operated with or without man in a remote and real-time manner. The new system produces no traditional problems, including leakage, bad odor, and insects, allowing a harmless, stable, dehydrated, and odorless treatment of urban sludge and living garbage. The new technique has found application in a number of places, including Shandong, Henan, and Tianjin. It will undoubtedly be an effective solution to addressing the sludge treatment in China’ s sewage treatment plants.

Novel Lithium Cell Material

Northeast Normal University, in collaboration with Liaoyuan Tongkun New Energy, has recently rolled out a novel lithium cell material that has passed expert’ s approval check. Experts believe that the advanced material is able to produce a large enough power for automobile applications, with a fine cyclic performance. The material keeps a 90% level of original volume even after 1,000 cyclic consumptions.

Researchers developed the advanced LiFePO4 material using a special mechanical activation process, before covering them with the carbon conducting material of a special structure. The material becomes a nuclei-crust structure after a high temperature handling, which raises the electrical conductance of LiFePO4 by 10 times, with a greatly enhanced work life, and an amazingly raised recharge time from 500 times to 2000 times.

The project has produced 8 papers collected by SCI, and two invention patents. It has also established a pilot production line with a daily capacity of 100 kg.

Industrial Digital TV Chip

Thanks to their 3-year efforts and repeated experiments, Zhejiang University Institute of Microelectronics and Photoelectronics, in collaboration with a team headed by Prof. HAN Yan, and with Hangzhou Shilan IC, has recently rolled out an IC chip for PDP applications, with a function and performance fully up to the design target. The new chip is able to work with both special high pressure components and low pressure control circuits, fully up to the requirements of a 42-inch PDP. The successful development of the new chip has resulted in a proprietary production line using 2.5um170V BCD technique at the Shilan IC.

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