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INTERNATIONAL COOPERATION

Peroxides Guess Confirmed

A study team, led by Prof. QI Fei with the University of Science and Technology of China Synchrotron Radiation Lab, in collaboration with the researchers at Nancy University, proved the existence of peroxides, a 20-year-old assumption extensively applied in low temperature oxidation of hydrocarbons. Researchers detected out a range of peroxides, including peroxy methane, peroxy ethane, peroxy butane, and carbonyl peroxides with four carbons, in the course of simulating an engine ignition process, using both synchrotron radiation spectrum technology and a jet stirring reactor. The findings were published in the

recent issue of the journal of Angewante Chemie International Edition.

With the support of the National Outstanding Youth Fund, the Chinese Academy of Sciences, and the Chinese Ministry of Science and Technology, QI and coworkers started to work with French researchers in June 2009, and confirmed that jet stirring reactor makes a most desirable experimental platform for understanding the low temperature oxidation of hydrocarbons, as it is able to simulate what happens under a natural temperature. Meanwhile, synchrotron radiation spectrum technology was proved a powerful tool to diagnose combustion activities. The successful application of the spectrum technology in the jet stirring reactor is the key to unveiling the existence of peroxides and their concentration variations with temperature. The finding facilitates the study of low temperature oxidation of hydrocarbons, providing more detailed and accurate theoretical guidance for applied studies in the area.

Novel 8-speed Automatic Gearbox

China made the debut of its first proprietary eight-speed automatic gearbox (8AT) at an international auto show on April 23, 2010. It takes three years for a group of developers, including Weifang Shengrui Transmission, Beijing University of Aeronautics and Astronautics (BUAA), Technische Universitat Chemnitz, and RICARDO, to work out the new gearbox. According to BUAA Prof. XU Xiangyang who is also part of the project, the innovative gearbox is built on technically proven components, though realigned in a brand new solution, allowing optimized transmission distributions and flexible shift logics. Comparing with 4AT/5AT/6AT, 8AT offers an improved comfortableness for gear shift, enhanced acceleration, and reduced oil consumption/emission. The test run performed by RICARDO has proved the efficiency of the novel gearbox.

The new 8AT gearbox, also supported by the Chinese Ministry of Science and Technology for its development, has filed both domestic and international patent applications.

RESEARCH AND DEVELOPMENT

LoongSon Firewall

DAWNING has recently rolled out a firewall product built on its LoongSon chips. The new firewall hardware platform works with the safe operating system developed by DAWNING. The integrated information security product enjoys greatly reduced power consumption by 50%, compared with the overseas products at the same level.

According to a briefing, the LoongSon chip based kilomega firewall is able to fence off the

visit attempts made by illegal users, securing a solid security network for users, and providing safe filtering functions for external connections, which effectively prevents the system from the possible attacks of viruses, Trojan, and worms. Meanwhile, the new firewall is designed with a range of applicable functions, including advanced Router, flow management, attack preventing IPS, and VPN.

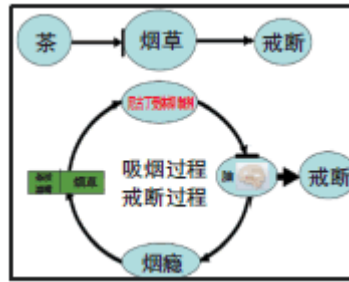
Newest Wetland Map

Thanks to 3-year efforts, Chinese scientists, at CAS Institute of Remote Sensing Application and Beijing Normal University, have prepared a nationwide wetland map showing the latest wetland status in the country, based on some 1,200 satellite images, and more than 1,4000 images derived from a China-Brazilian resources satellite. The latest findings show that China has seen a reduced wetland area by 11.46% in a period of twenty years, from 366,000 km² in 1990 to 324,000 km² in 2008. It is worth mentioning that of the wetlands currently registered, only 210,000 km² are relatively permanent in nature, with others mostly the temporary wetlands shaped up by the melted glaciers and frozen earth.

According to a briefing, in the past 20 years, both Heilongjiang and Inner Mongolia have witnessed a reduced wetland area by more than 10,000 km², with the total wetland area over the so-called three-river plains in the northeast part of the country coming down to less than 1/3, compared with the time when New China was founded. Tibet, on the contrary, has enjoyed an increased wetland area by some 7,000m². Study results show that, over the past 20 years, China has registered more man-made wetlands, from 23,115km² in 1990 to 38,656 km² in 2008, with a growth rate of 67.23%, though the natural wetlands came down by 16.76% in the same period.

The new wetland map presents solid evidences for the national wetland survey in the future, creating a fine ground for long term wetland monitoring. The map would also produce applicable environment parameters for understanding the spread of infectious diseases, as a range of such diseases, including schistosomiasis, malaria, and bird flu, are closely associated with their habitat environment, including wetland.

New Approach for Quitting Smoking



Researchers, led by Prof. ZHAO Baolu at the Institute of Biophysics, part of the Chinese Academy of Sciences, have recently reported a new approach to reduce the deleterious effects of cigarettes smoking in the recent issue of *China Science: Life Sciences*, based on 20-odd years' study of tea cigarette filter.

Two groups of more than 100 volunteers aged between 18 and 65 have tried tea cigarette filters at Beijing Garrison Hospital. Group I cut down the daily consumption of cigarette by 43% on an average in first month, and 56.5% in the following month. Group II showed a reduced daily consumption of cigarette by 48%, 83%, and 91% in first, second, and last month, respectively. In the last month, volunteers cut down the daily consumption of cigarettes to three on an average. The tea cigarette filter is easy to use and applied, without side effects. Study shows that theanine in the filters is able to noticeably inhibit rats' dependence on nicotine, and reduce the expression of nicotine receptors in animals' brain and the release of dopamine. Meanwhile, the tea cigarette filter cuts down the production of cancer causing matters, such as radicals and nitrosamine, and carbon monoxide, reducing the toxicity of smoking.

Unlike traditional smoke quitting approaches, tea cigarette filter cuts down one's desire to smoke in the course of smoking. Each inhaling would result in the release of theanine, which goes to the nicotine targets in the brain through blood circulations. The attack of theanine to the nicotine targets will be cumulated for its effect. As a result, smokers may quit smoking as a smoker, without being subject to psychological or physiological stress. One may unconsciously cut down the nicotine level in his or her body to a normal level, making smoking less and less desirable, without causing complications derived from quitting smoking.

Silkworm Methylome Reveals an Epigenomic Map

Researchers at CAS Kunming Institute of Zoology, BGI-Shenzhen, Southwest University, and Shanghai Tumor Institute, reported their findings that single base-resolution methylome of the silkworm reveals a sparse epigenomic map in the May 2, 2010 issue of *Nature Biotechnology*.

A team of researchers, headed by WANG Wen, a research fellow at CAS Kunming Institute

of Zoology, working with researchers from other research institutes, has revealed a sparse epigenomic map derived from single base-resolution methylome of the silkworms, using the latest sequencing techniques. Researchers found that 0.11% of genomic cytosines are methylcytosines, or 1/50 lower, compared with mammals and plants. Methylation is substantially enriched in gene bodies, and is positively correlated with gene expression levels, suggesting it has a positive role in gene transcription. This work contributes to people's understanding of epigenetics in insects, and runs counter against the results derived from the previous studies of the highly methylated genomes.

High Performance IC Design

A study, headed by REN Junyan, Director of Fudan University IC Lab, to develop the next generation broadband mobile communication network, a major national earmark project, has achieved major progresses. Researchers have rolled out a 14bit 100MS/s ADC prototype chip, with a performance reaching an internationally advanced level. The high-end product, able to work with both analog and digital integrated circuits, has been applied to turn a nonlinear capacitance into a near-constant suspension capacitance, and to develop a high linear switch with a reduced resistance for an improved dynamic performance. It has also been applied to improve the backstage calibration algorithms for dither, and optimize the area and power consumption secured by algorithm circuits, enhancing the dynamic performance of circuits.

Improved Tea Safety

Tea production safety and associated quality control techniques, a project under the national food safety and associated key technologies program, contracted to Anhui Agriculture University, recently passed an approval check. The study team established a generic lab for tea quality and safety test, introduced 9 new food safety findings, worked out the criteria for testing pesticide residues and heavy metals in the soils where tea trees are grown, and developed a range of techniques able to quick test formaldehyde and trace the origins of tea. Researchers also developed fine practices for tea garden operations, technical regulations for using chemicals, and clean tea processing and production techniques, making the establishment of a quality control system that can monitor clean tea production and track tea origins possible.

The efforts have resulted in a range of major needed technologies for equipment connection, contamination control, and automatic control, and established clean tea production lines able to make green tea and four brand name teas, allowing tea leaves being processed in a low temperature, closed, and fully automatic environment, and making the tea making industry efficient, high quality, energy efficient, and clean production activities.

Ginseng Genome Sequence

Not long ago, China kicked off a project to map up Ginseng' genome. An array of research institutes, including CAS Changchun Institute of Applied Chemistry, Institute of Medicinal Plant Development, part of the Chinese Academy of Medical Sciences, and Tianjin University of Chinese Medicine, have been involved in the mapping efforts. Researchers will work on full Ginseng genome sequencing and associated patching up, in an attempt to create a ground for the future studies in the area of functional genomics, proteomics, metabonomics, genetic metabolism engineering, and molecular genetic breeding. Researchers also plan to sequence and analyze the transcriptomics of different developmental stages and tissues, interpreting Ginseng genome and transcriptomics, sorting out functional genes, and cloning/identifying the genes able to synthesize and regulates the production of Ginsenoside. The efforts will facilitate the study and development of Ginsenoside drugs, creating a theoretical ground for breeding new and high quality Ginseng species through genetic engineering and molecular breeding means.

New Approach to Know Herb Activity

Changchun Institute of Applied Chemistry, part of the Chinese Academy of Sciences, has recently rolled out a new instrument able to analyze the activity of traditional Chinese medicinal herbs in both quantitative and qualitative manner. The patented technique is designed to evaluate the quality and activity of traditional medicinal herbs through capillary electrophoresis in a fast, efficient, and easy manner. Combining the techniques of analyzing the fingerprint spectrums of medicinal herbs and measuring their activity, the novel instrument enjoys numerous merits, including reduced costs, easy operation, quick analysis, and high sensitivity.

Chinese Made Reactor Pressure Vessel

Not long ago, China First Heavy Industries (CFHI) was allowed to officially kick off a process making a pressure vessel for No. 2 nuclear reactor at CNNC Sanmen Nuclear Power. CFHI was contracted in 2009 to make the pressure vessel for the 3rd generation nuclear reactor AP1000. It developed technical solutions for making a major vessel forging, and delivered the cylinder forging for connecting the tube in the middle of December 2009. CFHI officially entered the stage of manufacturing the reactor pressure vessels at the end of April 2010, upon the technical approval of National Nuclear Power Engineering, National Nuclear Power Technology, and Sanmen Nuclear Power.

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