HARBIN INSTITUTE OF TECHNOLOGY
NEWSLETTER 2015

HIT TIMES

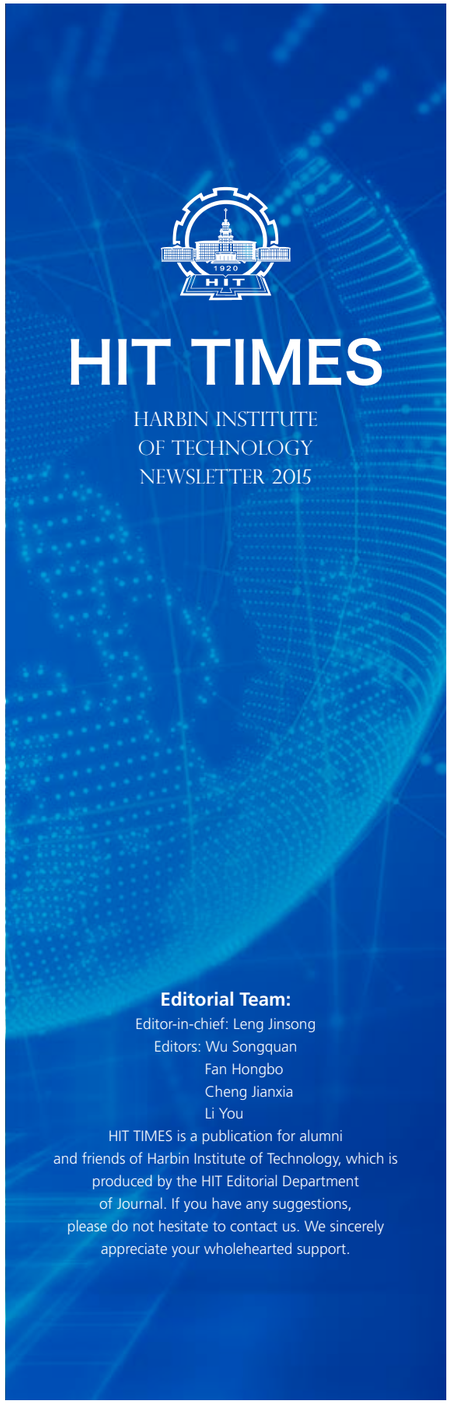
LILACSAT 2 LAUNCHED SUCCESSFULLY

SCHOOL OF ARCHITECTURE GROUP WON THE FIRST PRIZE OF D3 NATURAL SYSTEMS 2015

HIT ROBOT PRODUCTS EXHIBITED IN THE WORLD ROBOT CONFERENCE

INTERNATIONAL CULTURE CARNIVAL

HIT WON 7 STATE SCIENCE AND TECHNOLOGY AWARDS



Editorial Team:
Editor-in-chief: Leng Jinsong
Editors: Wu Songquan
Fan Hongbo
Cheng Jianxia
Li You
HIT TIMES is a publication for alumni and friends of Harbin Institute of Technology, which is produced by the HIT Editorial Department of Journal. If you have any suggestions, please do not hesitate to contact us. We sincerely appreciate your wholehearted support.

Contents

MESSAGE FROM HIT PRESIDENT

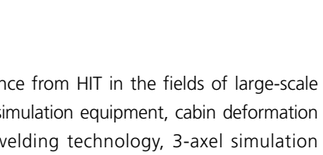
I would like to convey my best wishes, on behalf of Harbin Institute of Technology (HIT), to our current students and faculty members, retired faculty and staff, domestic and overseas alumni, and friends who have joined our endeavours and continue to support HIT.

HIT was founded in 1920. It has now developed into a renowned multi-disciplinary, open and research-based university, featured in science and technology. HIT has established its branch campuses in Shenzhen and Weihai, as well as the main campus in Harbin, forming a pattern of"One university, three campuses". HIT now has 73 undergraduate programs, 147 master programs, 81 doctoral programs, 18 post-doctoral research stations. Keeping pace with the world, we are making every endeavour for the brilliant vision to become one of the world's top-class universities.

With a strong capacity for research and innovation, HIT has been undertaking large-scale and highly sophisticated national projects. HIT's ability in performing scientific research has always been among the top in China. HIT scientific research programs rank the 2nd among all universities in China. HIT has been making great contributions to China's hi-tech research by leading the way in cutting-edge inventions in scientific research fields. The famous "Shenzhou Series Spacecraft Project" received a massive amount of assistance from HIT in the fields of large-scale land-based space simulation equipment, cabin deformation and orthopraxy welding technology, 3-axel simulation experimental platform and fault diagnosis. The micro-satellite "Experimental Satellite-1", constructed mainly by HIT, was the first satellite fully developed and launched by a Chinese university. The technical advancements in the satellite meet international aerospace standards and mark a new chapter in the history of HIT and China's history of astronautics.

In 2015, the State Council of PRC officially announced the "Overall Plan to Promote World-Class Universities and World-Class Disciplines". HIT is working on being a world-class university. We have signed academic cooperation agreements with institutions of higher education from 34 countries such as the United States, the United Kingdom, France, Australia, Japan and Russia. Collaborations and exchanges are carried out between HIT and these universities through the exchange of students, faculty and research staff, hosting academic conferences and cooperating in scientific research.

Today, all the faculty, students and staff of HIT, are bravely committed to building HIT into a well-known world-class university and will continue to explore new research frontiers and scale greater heights in research excellence. ■



HIT WON 7 STATE SCIENCE AND TECHNOLOGY AWARDS

The "Annual State Science and Technology Awards Ceremony" was held in Beijing on January 9, 2015. China's President Xi Jinping attended the ceremony with Premier Li Keqiang and other top government officials. The event took place at the Great Hall of the People in Beijing when China's most prestigious awards for scientific and technological achievements in 2014 were presented to 318 research projects.

Started in 2000, The State Science and Technology Award of China is the highest scientific award issued to scientists working in China handed out by China's President. Given annually each January, State Science and Technology Prizes were established by the State Council of the People's Republic of China.

Harbin Institute of Technology won 7 awards including 2 State Natural Science Awards, 3 State Technological Invention Awards and 2 State Science and Technology Progress Awards.

The project on "Satellite-Ground Laser Link System Technology" led by Prof. Ma Jing from School of Astronautics won the first prize of State Technological Invention Awards.

"The Heated-Induced Damage Mechanism and Failure Behavior of Composite Materials under Ultra-High Temperature Conditions" led by Prof. Han Jiecai from the School of Astronautics, and a project on "Control Theories and Methodologies for Dynamic Systems with Network-Induced Constraints" led by Prof. Gao Huijun from School of Astronautics, won second prizes of the State Natural Science Awards.

"Key Technologies of Space Deployable and Locking-Releasing Mechanism" led by Prof. Deng Zongquan from School of Mechatronics Engineering, and a project led by Prof. Feng Jicai from School of Materials Science and Engineering both won second prizes of State Technological Invention Awards.

The project led by Prof. Zhai Guofu from School of Electrical Engineering & Automation, and "Key Technology on Fire Resistance of Reinforced Concrete Structure and Its Application" led by Prof. Zheng Wenzhong from School of Civil Engineering both won the second prizes of State Science and Technology Progress Awards. ■

PROF. DU SHANYI AWARDED THE WORLD FELLOWS OF THE ICCM

At the 20th International Conference on Composite Materials held in Copenhagen during 19-24 July 2015, Prof. Du Shanyi from School of Astronautics in HIT, who is a Member of Chinese Academy of Engineering and the President of the Chinese Society for Composite Materials, was awarded World Fellows of the International Committee on Composite Materials (ICCM). Prof. Du is the first Chinese scientist who has received this honour. Meanwhile, the other three awardees are Prof. Michael R. Wisnom from the University of Bristol, Prof. Alan A. Baker who is a Fellow of the Australian Academy of Technological Sciences and Engineering, and Prof. Ozden Ochoa from Texas A&M University, who is also the President of the American Society for Composite Materials, all of whom have previously served as the president of the ICCM.

ICCM is an international, non-governmental, non-profit, scientific and engineering organization dedicated to composite materials. The World Fellows of the ICCM is a lifelong award for scientists with international reputation. The award recipients have made outstanding academic contributions in the area of composite materials and get international recognized achievements in promoting the international cooperation, academic communication, and talent cultivation in the composites fields. Since 2001, 19 experts in the composite materials area have obtained this honour and only 4 of them are ethnic Chinese scientists including Prof. Du Shanyi. Other three ethnic Chinese scientists are Prof. Stephen W Tsai (2001), who is a Lifetime Professor from Stanford University and one of the pioneers and founders of the composite materials field, Prof. Tsu-Wei Chou (2009) from the University of Delaware, who is the Editor-in-Chief of Composites Science and Technology and Prof. Chin-Tec Sun (2013) from Purdue University, who is an internationally famous expert in the area of composite materials and structural dynamics.■

PROF. HAN JIECAI ELECTED AS MEMBER OF THE CHINESE ACADEMY

On December 7, the Chinese Academy of Sciences announced the list of newly elected members of whom there were 61 persons in total with an average age of 53.9. Professor Han Jiecai from Harbin Institute of Technology (HIT) was one of them.

Born in 1966, Prof. Han Jiecai is now the Vice President of HIT, Director of the National Key Laboratory of Science and Technology on Advanced Composites in Special Environment, part-time committee member of the General Armament Department, recipient of the Science Foundation of National Outstanding Youth, chief scientist of the creative research group of National Science Foundation, Vice Director of the Theme Project of National 863 Plan, Vice Director of national important projects expert group for special materials, Managing Director of Chinese Society for Composite Materials, and Vice President of the Chinese Society of Theoretical and Applied Mechanics.

He has been doing research on aerospace materials such as super-high temperature-proof composites and wave-transmitting materials for a long time. As the first laureate, he received the second prize of the State Natural Science Awards 2014 and second prizes of State Technological Invention Awards in 2009 and 2011. He has published over 350 academic papers with more than 7,000 citations. 9 of his papers have been chosen as hot paper and he has gained 65 nationally-authorized patents. He also received the Model of National Youth Technology, the Award Nomination for the 13th National Top10 Outstanding Youth, the Youth Teachers Award of the first session, the Advanced Worker of the National Defence Industry. ■

PROF. LI SHENG WON THE ACL LIFETIME ACHIEVEMENT AWARD

President of ACL and Professor of Stanford University Chris Manning presenting the award to Professor Li Sheng

At the annual conference of The Association for Computational Linguistics (ACL) held in Beijing the President of the Chinese Information Processing Society, Professor Li Sheng from School of Computer Science and Technology won the ACL Lifetime Achievement Award due to his decades of contributions and achievements in research on machine translation direction, becoming the first laureate in China and the second one in Asia. With 53 years of history, ACL represents the world's highest level of computational linguistics. ACL's annual conference is the leading international conference on natural language processing. Papers published annually reflect the latest trends in research and academic progress in the field of NLP, drawing widespread attention of academia and industry. ACL annually awards "Lifetime Achievement Award" to outstanding scientists in NLP.

Professor Li Sheng has presided over more than 10 research projects including projects of the original Aerospace Corporation, "863" program, projects of the National Natural Science Foundation of China, and has won seven ministerial progress prizes in scientific and collective technology. As one of the pioneers, he began to study C-E machine translation since 1985. In 1989, the C-E machine translation system CEMT-I, developed by Prof. Li's team, became the first system passing the technical appraisal in China and won the ministerial progress prize in scientific and collective technology. Prof. Li has studied in the field of machine translation for many years and achieved remarkable achievements in machine translation technology and natural language processing (NLP), which includes the related syntax and semantic analysis. He has made many pioneering contributions to the development of machine translation in China. Since China's reform and opening up, Prof. Li has not only achieved great research success, but also cultivated a group of outstanding young experts in the field of computer science, including the first Chinese President of ACL and the Vice President of Baidu, Dr. Wang Haifeng, the Principal Researcher at Microsoft Research Asia, Dr. Zhou Ming, and Dr. Zhang Min the Distinguished Professor of Soochow University. He contributes greatly to the development of China's computer technology from generation to generation.

Professor Li expressed his firm belief in the prospects of the development of machine translation in acceptance speech. He said: "In the cause of machine translation or even the field of NLP, I am like Yu Gong in the story 'Yu Gong Removing Mountains'. I will spare no effort to overcome the problems and obstacles. Even one day that I cannot continue, I still have my students. With efforts of generation after generation, we believe that the goal and dream of completely understanding the language of computers will eventually come true." ■

PROF. ZHOU YU ELECTED AS FELLOW OF AUSTRALASIAN FLUID MECHANICS SOCIETY

At the 19th Australasian Fluid Mechanics Conference in Melbourne, Professor Zhou Yu of Harbin Institute of Technology (HIT) was elected as the Fellow of Australasian Fluid Mechanics Society (AFMS), becoming one of 22 fellows (3 having passed away) of the Society. He is the first fellow from China and Asia.

Professor Zhou Yu has made outstanding achievements in the fundamental research of turbulent flows, flow-induced vibrations and active flow control and made outstanding contributions to the systematic study and understanding of two interacting cylinder wakes and was first to apply the optic-Bragg-sensor grating technique to flow-induced vibration measurements. He has published over 150 archival journal papers, including 20 in the prestigious Journal of Fluid Mechanics. His work has received more than 2000 ISI citations. In 2003, he received the VSJ best paper award medal from the Visualization Society of Japan. He was the recipient of the prestigious Chinese national "1000 Scholar Scheme" award in 2010 and also the recipient (2014-2015) of the Distinguished Visiting Scientist Scheme of the Commonwealth Scientific & Industrial Research Organization (Australia). He is the Associate Editor of AIAA Journal. Along with CARDC, he founded the international conference series of Fluid-Structure-Sound Interaction and Control (FSSIC) of which the 4th meeting (FSSIC2017) will be held in Tokyo, Japan.

PROF. MEI HONGYUAN AWARDED HONORARY FELLOWSHIP

As the National Engineering Survey and Design Master, the Dean of the School of Architecture at HIT and President of Architecture Design & Research Institute of HIT, Professor Mei Hongyuan was awarded the AIA Honorary Fellowship, for his outstanding contribution to the world research and practice in the field of cold region architecture design.

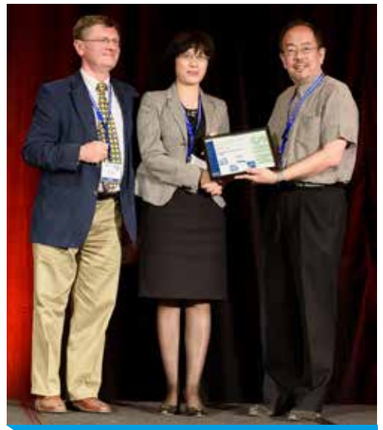
Prof. Mei receiving the AIA Honorary Fellowship medal from the 2015 AIA chairman Elizabeth Chu Richter and the 2014 AIA chairman Helene Combs Dreiling

The 2015 AIA award ceremony in Ebenezer Baptist Church

The award ceremony was held on 15 May 2015, in the famous Ebenezer Baptist Church in Atlanta, USA. Prof. Mei received the Honorary Fellowship medal from Elizabeth Chu Richter who was the chairman of AIA 2015. More than 100 American and foreign members attended the award ceremony.

The American Institute of Architects (AIA) is the most authoritative national group in the United States. With 158-year history, AIA has a high professional reputation globally. The AIA Honorary Fellowship is one of the top international awards for the architects who have made great contributions to and achievements in both architecture and society on the international level. World renowned experts such as Rem Koolhaas, Norman Foster, Renzo Piano and Kengo Kuma have also received this honor. Prof. Mei is the eighth AIA Honorary Fellowship from China in the span of 100 years. ■

PROF. LI HUI AWARDED STRUCTURAL HEALTH MONITORING PERSON 2015



Professor Li (middle) receiving the award

In September 2015, the 10th International Workshop on Structural Health Monitoring (SHM) was awarded by Stanford University in Palo Alto, San Francisco. Professor Li Hui was awarded the "Structural Health Monitoring Person of the Year 2015", for her exceptional contributions and dedications in the field of structural health monitoring. It is the first time that a scholar from Mainland China received this award and Prof. Li is also the first female laureate in history.

A Structural Health Monitoring Person of the Year (SHM-POY) is selected by the editors and associate editors of the journal *Structural Health Monitoring* (2014 IF: 2.663). The laureate should have made an outstanding contribution to the field of SHM and have benefited society.

Professor Li Hui is the Cheung Kong Scholar of Civil Engineering and Mechanics in Harbin Institute of Technology. She is the leader of Cheung Kong Scholars Team, the panel member of Natural Science Foundation of China (NSFC), and the coordinator of Transportation Infrastructure Panel in High-tech Program of Ministry of Science and Technology. She has received many awards for her outstanding contributions, such as the Outstanding Youth Scholarship of NSFC, the Award of Ho Lueng Ho Lee Foundation, the Nomination of the Women Youth Scientist in China, and the Talent of 21 Century of Ministry of Education etc. ■

5 HIT PROFESSORS AWARDED CHEUNG KONG SCHOLARS AND 4 PROFESSORS WON NATIONAL SCIENCE FUND FOR DISTINGUISHED YOUNG SCHOLARS

The Cheung Kong Scholars Programme was established by the Li Ka-shing Foundation (LKSF) and the Ministry of Education (MoE) in 1998 to help support the country's pressing need to foster innovation and higher education reform. The Programme has been responsible for setting up specially appointed professorship posts in various universities throughout the country and has attracted a large group of overseas Chinese to return to the Mainland to work in academic and research positions. It has also created the Cheung Kong Scholar's Achievement Awards to give recognition to academics for outstanding achievements in their fields of research. These great achievements are powering new discoveries and new possibilities to extend the boundaries of science in universities and research institutes throughout the Mainland.

In 2015, 5 professors from Harbin Institute of Technology were qualified as Cheung Kong Scholars:

Shan Debin from School of Materials Science and Engineering

Su Yanqing from School of Materials Science and Engineering

Tan Yiqiu from School of Transportation Science and Engineering

Yang Chunhui from School of Chemistry and Chemical Engineering

Zheng Ping from School of Electrical Engineering and Automation

The National Science Fund for Distinguished Young Scholars aims at speeding up the growth of young scientific talents, encouraging overseas Chinese scholars to work in China and fostering a group of prominent academic pacemakers in the forefront of world science and technology. The Fund specially supports excellent young Chinese scientists under the age of 45, who work full time in Mainland China, doing basic research in natural sciences. Mainland China mentioned in this fund refers to all provinces, autonomous regions and municipalities of China except Hong Kong, Macao and Taiwan.

In 2015, 4 professors from Harbin Institute of Technology won the National Science Fund for Distinguished Young Scholars:

Zhang Xinghong from School of Astronautics

Fan Feng from School of Civil Engineering

Zhang Qinyu from School of Electronics and Information Engineering in HIT Shenzhen

Wu Ligang from School of Astronautics

10 SUBJECTS OF HIT LISTED IN THE QS WORLD UNIVERSITY RANKINGS BY SUBJECT

Recently, the latest "QS World University Ranking by Subject 2015" was officially released by Quacquarelli Symonds (QS) in London. Ten subjects of Harbin Institute of Technology (HIT) were on the list, which was the best performance among universities affiliated to the Ministry of Industry and Information.

Civil and Structural Engineering is the highest ranking subject of HIT (rank 51~100); followed by Materials Science (rank 101~150); Chemical Engineering and Technology, Space and Machinery Manufacturing and Electronic and Electrical Engineering (rank 151~200); Mathematics and Environmental Science (rank 201~250); Computer Science and Information System (rank 251~300); Physics and Chemistry (rank 301~400). All of the ten subjects belong to the category Engineering and Natural Science, in the ranking by QS, which are the major subjects of Engineering and Science in HIT. The rankings show HIT'S academic reputation, employer reputation and research impact.

QS has been producing authoritative, independent, global rankings since 2004 and continues to lead innovation in the ranking and evaluation of higher education institutions worldwide. The QS World University Rankings by Subject highlights the world's top universities in a range of popular subject areas, covering 36 subjects as of 2015. It looks at three indicators: Academic Reputation, Employer Reputation and Citations per Paper. Weightings are not applied evenly between indicators for different disciplines and are based on publication patterns and level of employer interest in the given subject area — all subjects have attracted solid academic and employer response levels.■

HIT LISTED IN TOP 10 OF BEST GLOBAL UNIVERSITIES FOR ENGINEERING 2015

U.S.News announced Best Global Universities for Engineering 2015. Harbin Institute of Technology was ranked 7th on the list.

These well-regarded universities from around the world have shown strength in producing research related to a variety of engineering topics. They include aerospace engineering, mechanical engineering, electrical engineering and civil engineering. All rely on the basic engineering concept of using math and science to solve problems. These are the world's best universities for engineering.

(http://www.usnews.com/education/best-global-universities/engineering)

#1	**Tsinghua University** China Beijing #59 – Best Global Universities	100 Subject Score
#2	**Massachusetts Institute of Technology** United States Cambridge, MA #2 – Best Global Universities	97.1 Subject Score
#3	**University of California--Berkeley** United States Berkeley, CA #3 – Best Global Universities	93.6 Subject Score
#4	**Zhejiang University** China Hangzhou, Zhejiang #106 (tied) – Best Global Universities	92.2 Subject Score
#5 Tie	**Nanyang Technological University** Singapore #74 (tied) – Best Global Universities	92 Subject Score
#5 Tie	**National University of Singapore** Singapore #49 (tied) – Best Global Universities	92 Subject Score
#7	**Harbin Institute of Technology** China Harbin, Heilongjiang #319 – Best Global Universities	90.9 Subject Score
#8	**Stanford University** United States Stanford, CA #4 – Best Global Universities	90.2 Subject Score
#9	**Georgia Institute of Technology** United States Atlanta, GA #64 (tied) – Best Global Universities	88.5 Subject Score
#10	**City University of Hong Kong** Hong Kong Kowloon, Hong Kong #187 (tied) – Best Global Universities	87.4 Subject Score

QUALITY AND QUANTITY OF HIT'S PAPERS RANK TOP IN CHINA

On 21 October 2015, the "Press Conference of Statistical Results of China's Science and Technological Papers" was held in Beijing. The analysis of patents and papers (published in SCI, EI, and CPCI-S) was announced. Both the quality and quantity of HIT's science and technological papers ranked at the top of all Chinese universities.

In the field of Natural Science, HIT had 2875 papers indexed by SCI ranking 12th in China. 3273 papers indexed by EI ranked 3rd and 744 papers indexed by CPCI-S ranked 2nd. There were 5 papers indexed by Science, Nature, Cell, and PNAS, which ranked 8th. 18450 international papers received citations and ranked 12th. The amount of the top 1/10 influential papers of SCI was 480, ranking 11th. As the first author, HIT had 717 papers ranking 7th. In 2014, 156 papers were published in the world's most influential journals in each field, which ranked 5th.

Moreover, 3 papers were awarded the "China's Top 100 Most Influential Papers Published in International Journals 2014", which ranked 3rd: "Combining Evolutionary Information Extracted from Frequency Profiles with Sequence-Based Kernels for Protein Remote Homology Detection" writen by Prof. Liu Bin from School of Computer Science and Technology, HIT Shenzhen; "Shape Memory Polymers and Their Composites in Aerospace Applications: a Review" writen by Liu Yanju from School of Astronotics; "Ultrafiltration Membrane Fouling Caused by Extracellular Organic Matter (EOM) from Microcystis Aeruginosa: Effects of Membrane Pore Size and Surface Hydrophobicity" writen by Dr. Qu Fangshu from School of Municipal and Environmental Engineering. "An Important Aspect of Big Data: Data Availability", writen by Li Jianzhong from School of Computer Science and Technology, was awarded "China's Top 100 Most Influential Papers Published in Domestic Journals 2014".

Recently, HIT aims to improve the quality and increase the quantity of science and technological papers by improving the evaluation system and reward system. The international academic influence of HIT will be increasingly promoted. ■

MOST CITED CHINESE RESEARCHERS FROM HIT

Recently, Elsevier announced the "Most Cited Chinese Researchers" and 20 researchers from Harbin Institute of Technology (HIT) were on the list.

In the field of Mathematics: Wei Junjie and Wang Mingxin;

In the field of Electrical and Electronic Engineering: Gao Huijun;

In the field of Energy: Yin Geping, Li Zhengqi and Wang Zhenbo;

In the field of Computer Science: Xu Yong and Wu Xiangqian;

In the field of Environment Science: Ren Nanqi, Li Yifan and Feng Yujie;

In the field of Material Mechanics: Zhou Zhengong;

In the field of Industrial and Manufacturing Engineering: Cheng Kai and Wang Yongzhang;

In the field of Control and Systems Engineering: Wu Ligang, Zhang Lixian and Liu Guoping;

In the field of General Engineering: Wang Xiaoli and Wang You;

In the field of Chemical Engineering: Lu Huilin.

The statistics were from the Scopus which is the largest abstract and citation database of peer-reviewed literature: scientific journals, books and conference proceedings. Delivering a comprehensive overview of the world's research output in the fields of science, technology, medicine, social sciences, and arts and humanities, Scopus features smart tools to track, analyze and visualize research. 1651 Chinese researchers in 38 disciplines were listed in "Most Cited Chinese Researchers 2014".■

HIT'S BIOLOGY AND BIOCHEMISTRY DISCIPLINES RANK TOP 1% OF ESI

In the data updated in May 2015, Essential Science Indicators (ESI) demonstrated that the Biology and Biochemistry departments of Harbin Institute Technology (HIT) rank in the top 1% of ESI global discipline ranking list, with 618 papers and 5569 total citations indexed by ESI in the last decade. As of the moment, 8 disciplines of HIT are in the top 1% of ESI, including Material Science, Engineering, Physics, Chemistry, Computer Science, Environmental Science and Ecology, Mathematics, Biology and Biochemistry.

Available through the ISI Web of Knowledge platform, Essential Science Indicators is a Web-based research tool that enables researchers and research evaluators to measure scientific performance and to track trends in science. This in-depth analytical tool surveys over 8,500 journals from around the world for article publication and citation count performance indicators. It ranks scientists, institutions (universities, corporations and government research labs), countries, and journals in 22 specific fields of research by the number of papers published, citations received, and citations made per paper. The data covers a rolling 10-year period plus bimonthly updates during the current year. By viewing the total citation counts and citations-per-paper scores for the last 10 years, ESI selects the top 1% of institutions in each field. ■

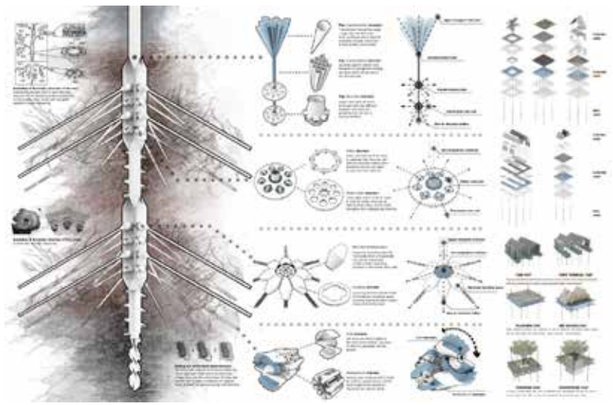
Essential Science Indicators℠
Powered by ISI Web of Knowledge℠

SCHOOL OF ARCHITECTURE GROUP WON THE FIRST PRIZE OF D3 NATURAL SYSTEMS 2015

D3 Natural Systems International Architectural Design Competition (D3 Natural Systems) requires "exploring the potential of ecological and sustainable design, and can affect urban life, which includes the building, based on interior design and design objects, and many other factors." In December 2015, D3 organization US announced the only first prize goes to China, a student team from the School of Architecture, Harbin institute of technology (HIT). The winning project is called "Root" designed by Li Zhibin, Hu YiFei, Shi Yuqing, Li Zongmin, Li Yan and Zhang Juntong. This is the second time that HIT students received the highest award of the world-class design competition besides the "EVOLO High-Rise International Architectural Design Competition".

As an annual international design competition, D3 Natural Systems invites architects, designers, engineers and students to collectively explore the potential of analyzing, documenting, and deploying nature-based influences in architecture, urbanism, interiors, and designed objects. D3 Natural Systems 2015 has three special prizes and six honorable mention awards available for the best projects.

"Appropriate adjustments to buildings can be made as the climate changes, so that the victims of the flood regions do not have to give up their homes", the designers said. They creatively put forward design ideas that let the bottom of buildings grow roots to continually make the soil solid. The functional conversion between the time of disaster and normal daily life can be achieved by the combination of residential units. Their creative concept and the beautiful imagination won the favor of the jury and finally achieved the great honor. ■



RESEARCH

LILACSAT 2 LAUNCHED SUCCESSFULLY

On September 20, LilacSat 2 (Zidingxiang 2, CAS 3H) was launched successfully in a cluster of 20 satellites on the maiden flight of the CZ-6 rocket, at the Taiyuan Satellite Launch Centre. It is a low-cost, nano-satellite for education, amateur radio communication and technology demonstration, built by a team of 15 students of Harbin Institute of Technology (HIT).

It is a cube-shaped 20 cm × 20 cm × 20 cm satellite with a weight of 12 kg. The lifetime of LilacSat-2 is expected to be 3 to 6 months. The planned orbit is 520 km × 520 km with an inclination of 97° inclination together with XW2. LilacSat-2 carries four payloads:

- A V/U amateur radio SDR platform. It can be configured as an FM repeater or an APRS digipeater. It will also provide a VHF CW beacon and UHF 9k6 BPSK telemetry downlink
- An SDR based multi-band receiver, for reception and decoding of signals from AIS, ADS-B, etc.
- An FPGA software testing platform.
- A thermal infrared camera.

16 minutes after launch, the ground station in Singapore received the satellite signal. On the afternoon of September 20th, LilacSat-2 provided the first long wave infrared remote sensing image of Changbai Mountain District.

LilacSat-2 is the first satellite self-developed by university students. This team has an average age 24 and 5 of the students are licensed radio amateurs. LilacSat-2 provides hands-on experience for students who would not otherwise have the opportunity to build flight hardware for a space mission. The training these students gain by working on this project will better prepare them for work in the aerospace industry. ■

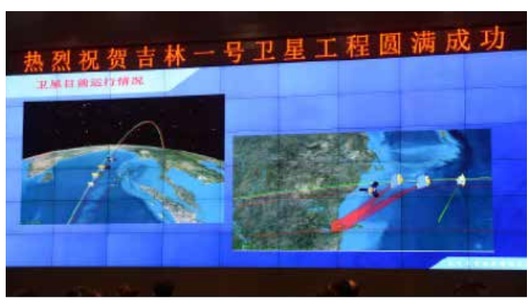
JILIN-1A CO-DEVELOPED BY HIT LAUNCHED SUCCESSFULLY

Prof. Cao Xibin from HIT, Director of Jilin-1A satellite system, interviewed by CCTV

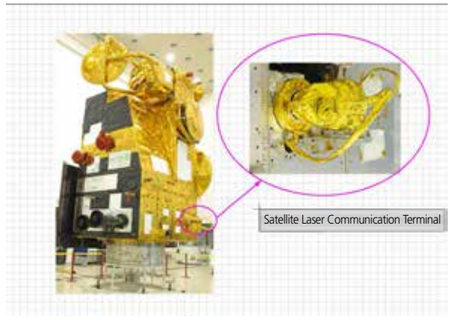
On October 7, China launched Jilin-1 mission using a Long March-2D launch vehicle from the 603 Launch Pad at the Jiuquan Satellite Launch Centre's LC43. It was developed and produced by Changchun Institute of Optics, Fine Mechanics and Physics (CIOMP) under the Chinese Academy of Sciences (CAS), Harbin Institute of Technology (HIT) and Chang Guang Satellite Technology Co., Ltd. Professor Cao Xibin of HIT was the director of satellite system.

"Jilin-1A" optical satellite is China's first self-developed remote sensing satellite for commercial use, which will provide photographs to commercial clients while helping with harvest assessment, geological disaster prevention and resource surveys. China's first domestically developed commercial Earth imaging satellites are up-and-running in orbit, and are the first step in an ambitious plan to secure a niche in a growing sector and help revitalise the Northeast China economy. With China undergoing rapid urbanisation, urban development, changes in agriculture and strain on resources such as water, a range of clients could come to realise the benefits of getting images from space. The satellites can provide remote sensing data support to many sectors including land resources monitoring, land surveying, mineral resource development, smart city construction, agricultural yield estimation, environmental monitoring, disaster prevention and more.

The success of Jilin-1A is the showcase of collaboration, innovation and HIT's micro-satellite technology. HIT is developing its satellite research and technology as a new economic driver. ■



CHINA SUCCEEDED ON ITS FIRST IN-ORBIT SATELLITE OPTICAL COMMUNICATION DEMONSTRATION



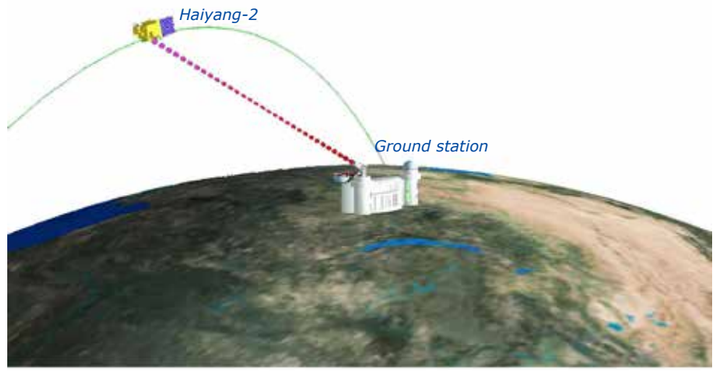
A team led by Prof. Ma Jing and Prof. Tan Liying in the School of Astronautics at Harbin Institute of Technology (HIT) successfully performed China's first in-orbit satellite optical communication demonstration, which established a high speed laser communication link between Haiyang-2 satellite and a ground station.

With the development of space technologies, more and more information needs to be transmitted from satellites to earth. The limited bandwidth of conventional satellite radio frequency communications has become the bottleneck of information transmission. Satellite laser communications, on the other hand, have advantages of high capacity, long distance transmission and high security etc., and can enable the development of information highway in space, providing high capacity communication services such as HD image and video streaming for customers. This is a new information transmission technology with extreme challenges yet broad applications.

The satellite optical communication group at HIT led by Prof. Ma and Prof. Tan has devoted more than 20 years in this field, achieving major breakthroughs in various key technologies. On 16 August 2011, a laser communication terminal developed by this team was launched into space with Haiyang-2 satellite; on October 25th, bidirectional high-speed laser communication between Haiyang-2 and the ground station was successfully demonstrated, with a link distance close to 2000 km, laser beam pointing accuracy on the order of micro-radian, and maximum data rate of 504 Mbps, achieving "accurate pointing, fast acquiring, stable tracking, and good communication". This was China's first in-orbit demonstration of satellite-ground laser communication link system. A complete success was achieved through comprehensive demonstration of the system technology.

Satellite laser communication is a major supporting technology in next generation high-speed communication system in space. It will change the existing satellite communication systems and revolutionize the area of information transmission in space. The success of this satellite-ground laser communication demonstration marks a significant breakthrough in China's high-speed information transmission in space and a major milestone in the development of China's satellite communication technologies.

The project "Satellite-Ground Laser Link System Technology" by HIT was awarded first prize of State Technological Invention Awards 2014.■



THE HEAT-INDUCED DAMAGE MECHANISM AND FAILURE BEHAVIOUR OF COMPOSITE MATERIALS UNDER ULTRA-HIGH TEMPERATURE CONDITIONS

A research team led by Professor Han Jiecai and Du Shanyi, with members of Zhang Xinghong, Wang Baolin, Meng Songhe, Hu Ping and Han Wenbo from the Center for Composite Materials, Harbin Institute of Technology (HIT), spent more than 10 years to do the research on the program of "The Heat-Induced Damage Mechanism and Failure Behaviour of Composite Materials under Ultra-High Temperature Conditions", which achieved achievements as follow:

1. Pneumatic thermal response and thermal damage mechanism of high temperature composites has been revealed.

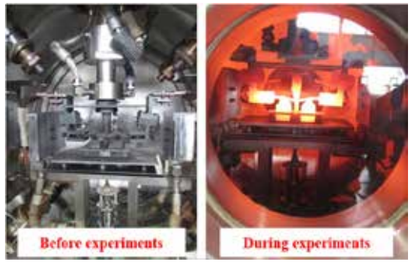
2. Thermally induced damage model and thermoplastic fracture mechanics of high temperature composites have been built.

3. Thermal/mechanical/oxidation and thermal/mechanical/electrical coupling failure behaviour of composites has been illustrated.

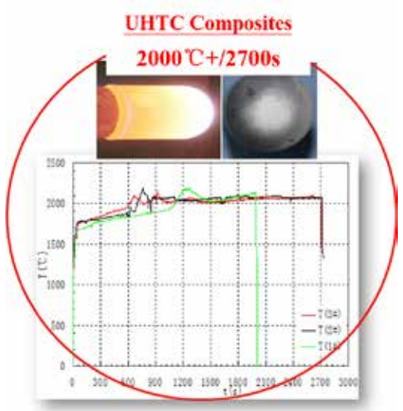
Basic scientific issues involved with hypersonic vehicles are hot academic research spots worldwide. The great challenges are high temperature materials themselves brought by "thermal barrier" resulting from high-speed flight and coupling problem between complex high enthalpy/no equilibrium flow environment and materials, which contain unrecognized and unresolved key scientific issues.

The main achievements have been published in international renowned journals such as Compos. Sci. Tech., J. Mat. Chem., Acta Materialia etc., with more than 1500 times citations, which have been positively evaluated by internationally famous scholars and institutions such as NASA, AFRL, aerospace centre in France and Italy etc. Related achievements have been applied to guide the research and development of ultra-high temperature heat-protective composites, which won 2nd prize of the State Natural Science Awards 2014.

The research was supported by the National Natural Science Foundation, National Science Fund for Distinguished Young Scholars, Major Research Plans, and National Innovative Research Groups.■

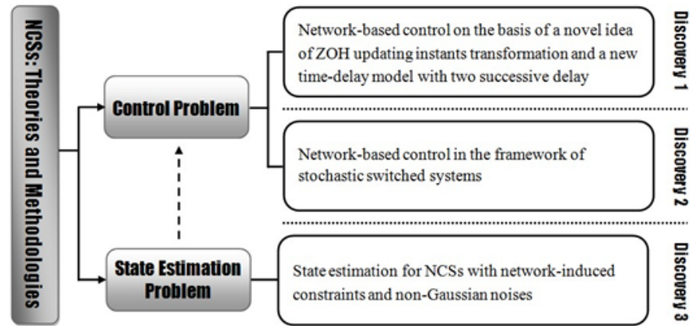


Self-developed high-temperature mechanical testing system



Long-time oxidation and ablation testing for ultra-high temperature ceramics above 2000℃ for 2700s

CONTROL THEORIES AND METHODOLOGIES FOR DYNAMIC SYSTEMS WITH NETWORK-INDUCED CONSTRAINTS



A team led by Prof. Gao Huijun, Wu Ligang and Zhang Lixian won 2nd prize of the State Natural Science Awards 2014, due to their contributions to the project of "Control Theories and Methodologies for Dynamic Systems with Network-Induced Constraints". All the three professors are from the Research Institute of Intelligent Control and Systems at HIT.

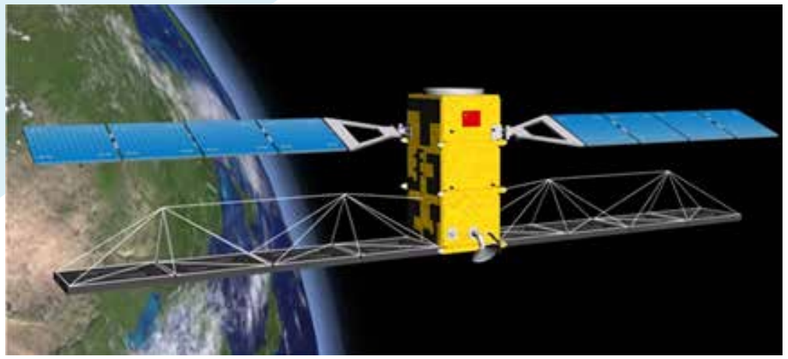
Following the technology stages of centralized control, distributed control and field-bus based control, network-based control has been well recognized as a revolutionary development in industrial process control. The introduction of networks has fundamentally changed the ways of signal transmission in control systems. Traditional control theories, based on the assumption of instantaneous and error-free communications, are not applicable to networked control systems (NCSs) with various network-induced constraints such as time delays and packet dropouts. NCSs have become an alluring research direction over the past decade.

Targeting at the bottleneck brought about by network-induced constraints, the achievers have carried out a systematic and comprehensive study, and established modeling, control and estimation theories and methodologies relevant to NCSs. I) For the case when the probability distribution information (PDI) of network-induced constraints is difficult to obtain, they have established network-based control theories and methodologies on the basis of a novel idea of the transformation of zero-order-holder updating instants and a new delay model with two successive delay components, with the simultaneous consideration of multiple network-induced constraints in a unified framework. II) For the case when the PDI of network-induced constraints are known or partially known, they have developed a stochastic switched system model for NCSs, and established a new mode-dependent approach for network-based control. III) For the case when the state variables are not fully measurable, they have proposed novel approaches to state estimation for NCSs, based on parameter-dependent Lyapunov functions, which overcome the limitations of the traditional Kalman filtering when applied to NCSs with non-Gaussian noises.

20 primary papers (14 of which are published in IEEE TAC and Automatica) have received 1621 SCI and 3305 Google Scholar citations (excluding self citations). 17 papers rank in Top 1% Highly Cited Papers, and 3 papers rank in Top 0.1% Highly Cited Papers, according to the ESI reports. Two papers were awarded the "Most/highly Cited Article" by Automatica. The 20 primary papers are cited in 71 IEEE TAC and Automatica papers and 121 other IEEE Transactions papers.

The project PI Gao Huijun and Co-I Zhang Lixian were invited as Guest Editors to organize a Special Section in IEEE Trans. Industrial Informatics, focusing on the theories and industrial applications of network-based control. The project PI Gao Huijun serves as Associate Editor for several prestigious international journals including Automatica and 5 IEEE Transactions. The Co-Is Wu Ligang and Zhang Lixian serve as Associate Editors for IEEE TAC and IEEE Trans. Cybernetics, respectively.

Partial results of this project won Tan KanKee Youth Science Award and two Natural Science Awards of Heilongjiang Province (first prize). The project PI Gao Huijun received the National Science Fund for Distinguished Young Scholars and the IEEE IES David Irwin Early Career Award. He was appointed as Yangtze River Distinguished Professor, and elected to IEEE Fellow for his contributions to network based control theory and industrial applications. The project Co-Is Wu Ligang and Zhang Lixian both won the National Science Fund for Excellent Young Scholars.■



KEY TECHNOLOGY OF SPACE DEPLOYABLE AND LOCKING-RELEASING MECHANISM

Nowadays, spacecraft needs to be folded and locked into small volume during the launch process and opened into its work state after entering orbit. The deployable technology has become the leading technology and research hotspot in the aerospace field because it heightens the level of remote communication in space, high-resolution earth observation and deep space exploration. Its theory has reached a peak in the field of machinery research, bringing challenges and opportunities to the aerospace engineering.

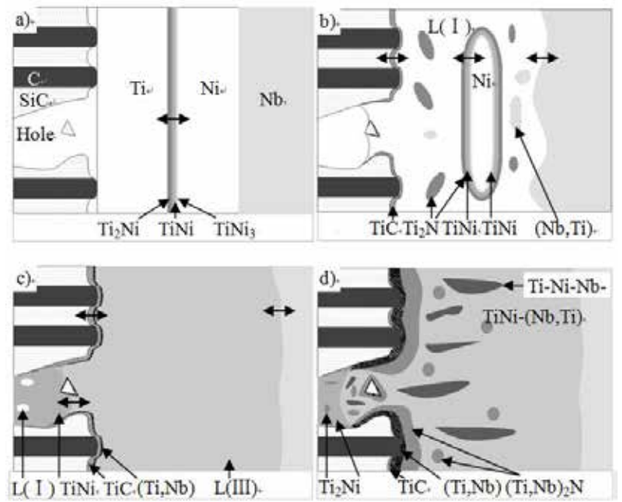
Research products with characteristics including large-scale, deployable and lightweight can meet the requirements of high rigidity, high precision, large unfolding ratio and high reliability in various missions. The main emphasis of the product is contained in 3 points. First, a new configuration of deployable equipment with large unfolding ratio has been designed. Prof. Deng Zongquan from HIT has defined a new method of connection between modules in large-scale deployable mechanism which has been published in the book "Design of Space Deployable and Foldable Mechanisms". Second, a new driving system has been invented which can solve the problem of a linkage driven system with high-rigidity structure. Third, a new locking-releasing mechanism with high reliability has been invented, which breaks through the technical difficulties related to impact and instability. On the basis of the product, the research team has developed a one-dimensional deployable mast, two-dimensional planar antenna, three-dimensional curved surface antenna and multiple unlocking mechanisms with less impact, large load and reusability.

The research team has built a new design method of deployable and locking-releasing mechanism and has mastered the key technology of configuration creative design, structure rigidity, locking and releasing process, driving system and module connection, improving the level of deployable mechanism technology in China to an internationally advanced level. The research achievements make a great contribution to the first 60-meter-long deployable mast in China, the mechanical arm on "Jade Rabbit" moon rover and the large caliber satellite antenna, providing technical support to successful implements and complement of major aerospace engineering. "Key Technology of Space Deployable and Locking-Releasing Mechanism"won second prize of State Technological Invention Awards 2014.■

MECHANISM STUDY OF THE COMPOSITE REACTIVE JOINING OF C/SIC COMPOSITE AND NB

As a novel high-temperature structural material, C/SiC composite has great potential in the fields of hot engine, astronautic thermal protection system and high performance brake discs. However, it is difficult to fabricate complex structures with complicated shape due to the limitation of the intricate fabrication process. As it is known to all that C/SiC composite is required to join with high-temperature metal to fabricate composite structure when this kind of composite has a widespread availability. During the process of joining C/SiC composite and metal, the poor wettability of the interface, the formation of brittle compounds and underlying residual stress field would deteriorate the properties of the joint significantly. Therefore, it is necessary to solve the problems to promote the properties of the joint.

A team led by Prof. Feng Jicai in the State Key Laboratory of Advanced Welding and Joining applied the TiNiNb ternary eutectic liquid phase to build the model of Ti-Ni composite with equal atom ratio to join C/SiC composite and metal, revealing the physical-chemical reaction process and metallurgical reaction mechanism of the multistage interfacial reaction. Through the pining enhancement of the eutectic liquid in the "original and presetting defects" of the composite surface, the residual stress field in the joint was reduced to some extent. The C/SiC composite and metal joint with high performance was obtained at the same time.



The mechanism of Ti50Ni50 foils composite reactive joining

The group has published the research results on STWJ sponsored by University of Cambridge and the paper was awarded as the top of ten high level papers of 2012 by STWJ. In addition, the group identified the microstructure of the joint of SiC and several metals, revealing the interfacial reaction data of SiC and Ti, Cr, Nb, Ta, TiAl, solving the international debate about the types and generating sequence and formation mechanism of the reaction production which occur in the SiC and Ti joint. These research results were acknowledged by the international counterparts. At the same time, the bibliographic search showed that the quality of scientific research found by the group ranked 4th in welding and joining research field and also ranked 1st in brazing and diffusion bonding field around the world.

Based on these research results, the strength of the C/SiC composite and metal composite reactive joint increased by 45% and the reliability of the joint was guaranteed. On the one hand, the novel technology lightened the weight of attitude control engine's thrust chamber nozzle by 75%; on the other hand, the weight of propellant increased by 50%. The welding standard for attitude control engine's thrust chamber had been made by manufacturers. This technology has been applied to braze various types of C/SiC and C/C composite attitude control engine's thrust chamber, providing technical support when using C/SiC and C/C composite in aerospace and aeronautic air vehicle.

The project was awarded the second prize of State Technological Invention Awards 2014.■

KEY TECHNOLOGY OF PARTICLE AUTOMATIC DETECTION

It is hard to avoid particles during the production of the sealed electronic components and equipments, thereby affecting the reliability and safety of aerospace models and weapon equipments. Caused by the particle impact, artificial satellites, rockets, missiles, aerospace planes accident has occurred many times, resulting in immeasurable loss.

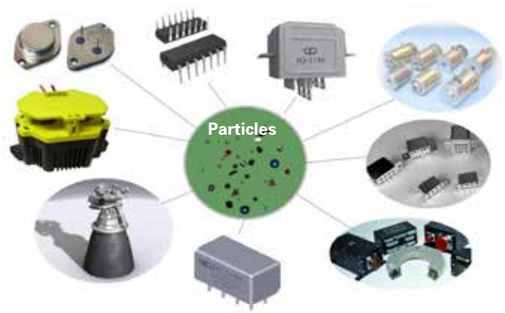
Particle impact noise detection (PIND) method is widely used to detect the particles in electronic components. From 1990s, China started to import full sets of American PIND equipments, and the test methods referred to the U.S. military test specifications. Years of practice shows that the detection accuracy of the current PIND detection methods and equipments is low and misjudgment rate is high. The main way to cope with the particles for developed countries is process control. However, the process control ability of china is limited, and it is difficult to avoid the particles.

Overall, the particle automatic detection technology for sealed electronic components and equipments is a bottleneck technology which should be resolved urgently in aerospace model and weapon equipment reliability field.

Since 2002, the particle automatic detection group in HIT led by Professor Zhai Guofu, funded by National Defense Industrial Technology Foundation Project, SASTIND Civil Aerospace Major Project, The PLA General Armament Department Spectrum Project, National Nature Science Foundation of China. With more than 10 years efforts, the group got breakthrough in the core technologies of PIND optimal experimental condition, the detection and material identification, and developed PIND testing standards. Series of particle automatic detection systems for sealed electronic components and equipment were successful developed. The technical problems of high-precision detection and material identification were solved. The main technical indicators reach the international leading level.

Particle automatic detection and identification technology for the sealed electronic components and equipment, designed by HIT, filled in the blank in China. The detection systems had been applied in more than 10 aerospace enterprises. The situation that PIND equipment depends on import has been changed. This technology is strong technical support of aerospace products and equipment reliability.

Particle automatic detection and identification technology for the sealed electronic components and equipment designed by HIT won the 1st prize of National Defense Science and Technology Progress Awards 2012, and the 2nd prize of State Science and Technology Progress Awards 2014.■



Particles in sealed electronic components and equipment

Series of particle automatic detection systems for sealed electronic components and equipment

KEY TECHNOLOGY ON FIRE RESISTANCE OF REINFORCED CONCRETE STRUCTURE AND ITS APPLICATION

The project "Key Technology on Fire Resistance of Reinforced Concrete Structure and Its Application" conducted by professor Zheng Wenzhong won the 2nd prize of State Science and Technology Progress Awards 2014, which presented key technology preventing the prestressed structures from spall and collapse under fire and enable the reparability of them.

The law of spalling on such structures under heat and the corresponding numerical model has also been developed, which provides a reliable method to predict spall of prestressed structures under severe heat. A predicting method of collapse of prestressed slabs and beams on thermal condition was presented to place guarantee on maintaining the status under fire. Additionally, a formula of thermal strength, modulus and creep is proposed to control the deformation of prestressed structures during the fire and thus billions of pre-stressed structures can be designed and constructed in a scientific way of fire resistance standard. Prof. Zheng conducted experimental research on mechanical properties predicting model of ultra-high performance concrete at elevating and elevated temperature proposing curves between standard cube compressive strength and critical spalling temperature. The relationship of compressive strength and fiber (PP and Steel) content is also presented, which will provide technical support to hundreds of high-rise reinforced concrete structures on fireproof design. The calculation of residual stress and ultimate stress in prestressed steel stand is presented with a conclusion indicating the failure of anchorage device due to the faster strength degradation in reinforcements rather than anchorage device. A kind of alkali slag cementing material which will maintain strength within 600 degree along with the matched calculation formula of anchorage length has been discovered.

These results were applied to dozens of safety assessments of concrete structures including “1.2” fire in Harbin, 2015. The research was adopted by 10 standards including the first resistance concrete design standard in China. Prof. Zheng obtained 10 invention patents and published 80 SCI/EI papers. His monograph, “Performance of Prestressed Concrete Structures and Its Fire Safety Design” is selected by National "Three One-Hundred" Original Book Publishing Project.■

BREAKTHROUGHS IN TARGET AREA OPTOELECTRONIC AND CONTROL SYSTEM OF SG-III FACILITY

The laser inertial confinement fusion facility, SG-III, is a tour de force of science and technology development in order to advance national security and energy security, as one of the key state science and technology projects of China, carried out in the 1990s. The SG-III Facility is the world's second largest and most energetic laser facility ever built, which is also the most precise and reproducible laser as well as the largest optical instrument in Asia. The giant laser, with nearly 10000 optics, precisely guides, reflects, amplifies and focuses 48 laser beams onto a fusion target about the size of a pencil eraser.

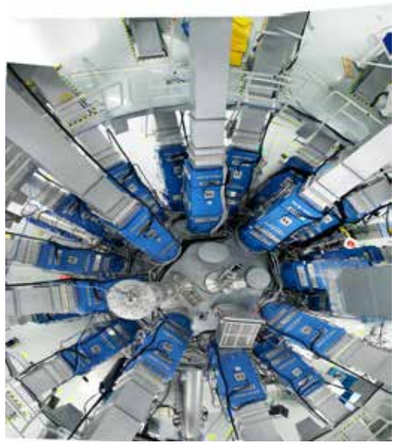
The target area optoelectronic and control system is the core of the SG-III Facility, which contains the computer control system, the target handling system and the final optics assemblies. A team led by Professor Liang Yingchun and Zhao Hang from Harbin Institute of Technology recently has achieved breakthrough in the key technology of the target area optoelectronic and control system.

With one of the most sophisticated computer control systems, a SG-III Facility target shot requires all 48 laser beams to arrive within 10 trillionths of a second of each other and to be aligned within 22 microns - quarter the diameter of a strand of human hair - all with the right frequency and energy level.

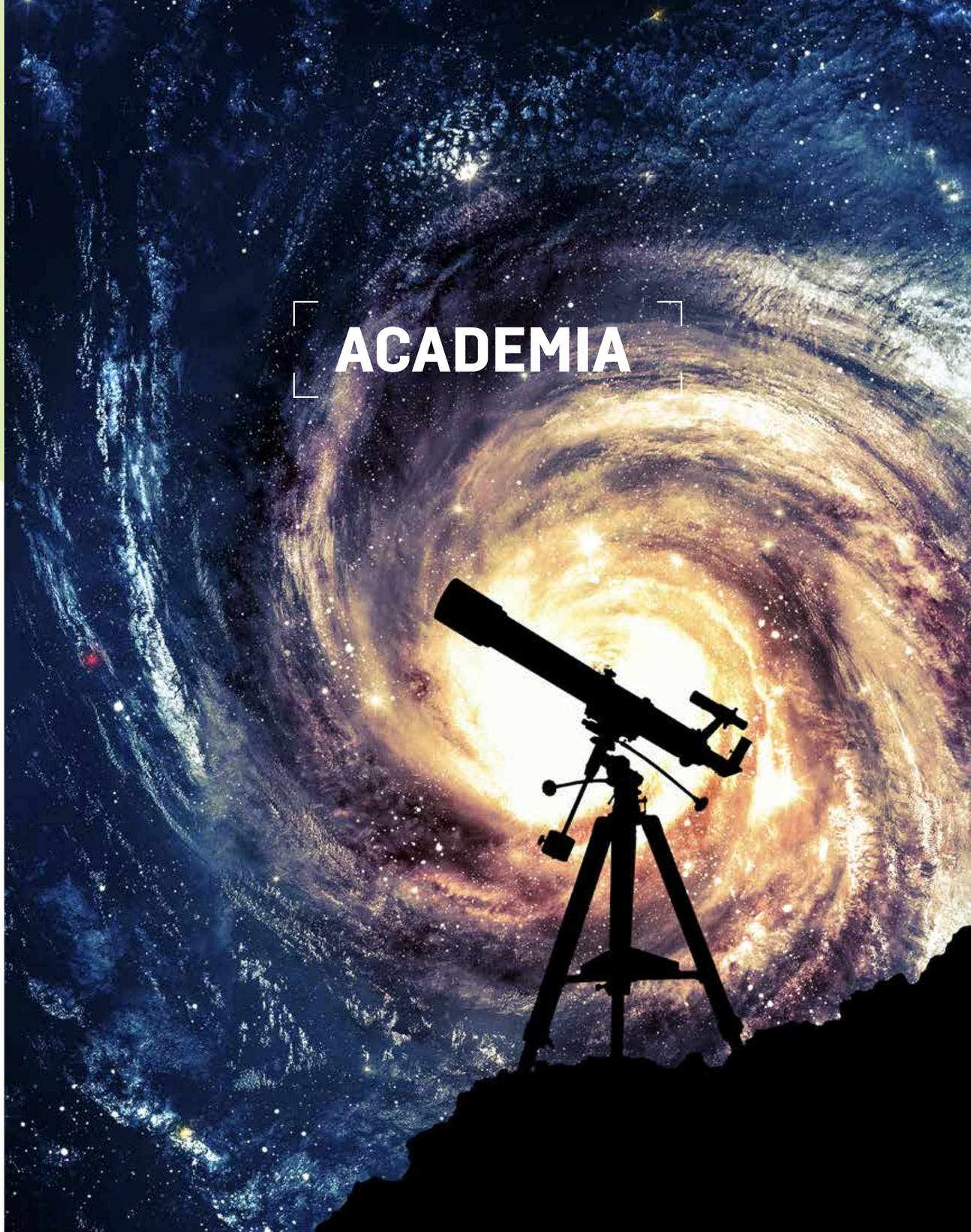
Target handling systems precisely position the target at target chamber center and five-meter-long positioners are located just outside the target chamber. They can be retracted to permit installation of a target and then extended to its position at target chamber center.

The final optics assemblies (FOAs) are the last element of the main laser system and the first of the target area systems. Each FOA incorporates beam conditioning, frequency conversion, focusing, diagnostic sampling, and debris shielding capabilities into a single compact assembly. The same mechanical, optical, and beam control components that are used in the FOA at the target chamber are reproduced for a single beamline in the precision diagnostic system.■

Target handling systems at target chamber center of SG-III laser facility

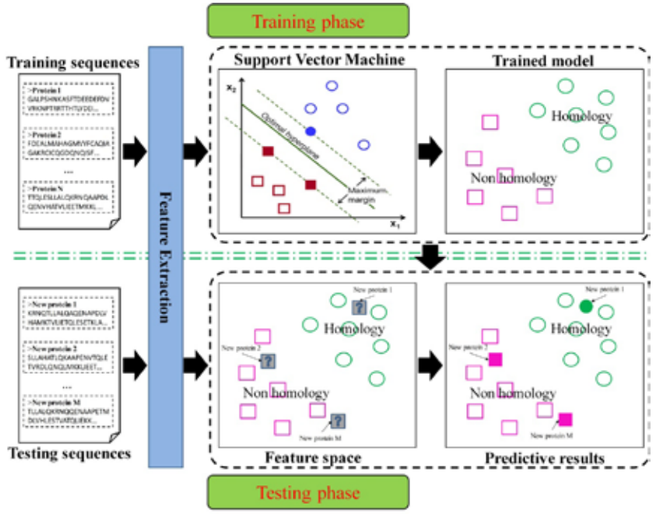


Final optics assemblies of SG-III laser facility



A NEW COMPUTATIONAL METHOD FOR PROTEIN REMOTE HOMOLOGY DETECTION FACILITATING THE PROTEIN SEQUENCE ANALYSIS

A research group led by Prof. Liu Bin from School of Computer Science and Technology, Harbin Institute of Technology Shenzhen Graduate School (HITSZ) published a paper titled "Combining Evolutionary Information Extracted from Frequency Profiles with Sequence-Based Kernels for Protein Remote Homology Detection" in the renowned bioinformatics journal BIOINFORMATICS. In 2015, his paper was selected as one of the "China's Top 100 Most Influential Papers Published in International Journals 2014", and ranked as the Essential Science Indicators (ESI) highly cited paper and hot paper by Thomson Reuters. The team proposed a novel protein remote homology detection approach via combining evolutionary information from frequency profiles with sequence-based kernels, which is becoming a very useful tool in sequence analysis.



Protein remote homology detection is one of the most fundamental and central problems for the studies of protein structures and functions, aiming to detect the distantly remote evolutionary relationships among proteins. The paper demonstrated that the profile-based protein representation containing evolutionary information extracted from the frequency profiles is a key to improve the performance of detecting remote homologous proteins. This approach can also provide useful insights for studying the features of proteins in various families. Furthermore, this method was useful for drug development, and applied to study the 3D structure of Nck51, one of the important parts of tau protein kinase II, an important therapeutic target against Alzheimer's disease.

The paper was financially supported by the National Natural Science Foundation of China, and the Natural Science Foundation of Guangdong Province.

The first and corresponding author for this paper is Prof. Liu Bin, whose group is exploring the "language models" of biological sequences, such as DNA, RNA, protein sequences, genomics, and developing new computational methods for computational proteomics.■

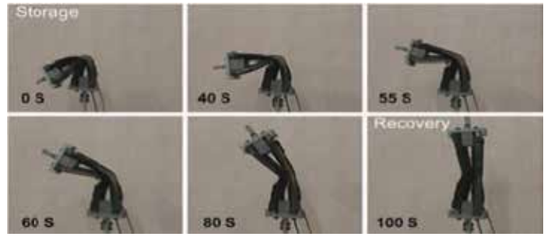
Reference

B Liu, et al. Combining evolutionary information extracted from frequency profiles with sequence-based kernels for protein remote homology detection. Bioinformatics, 2013, 30(4):472-9

TOPICAL REVIEW FOR SMART MATERIALS AND STRUCTURES

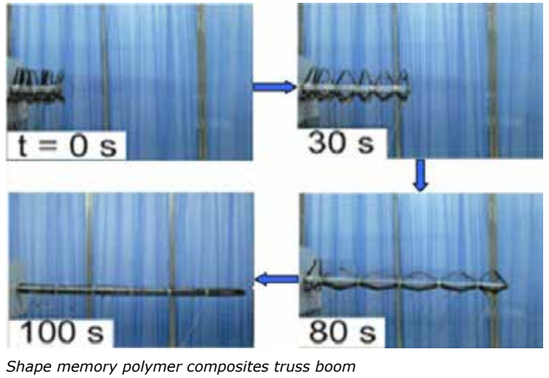
Invited by Smart Materials and Structures (SCI Impact Factor: 2.769), Prof. Liu Yanju from School of Astronautics in HIT published a topical review titled "Shape Memory Polymers and Their Composites in Aerospace Applications: a Review". This article has been selected as Hot Papers (ESI 0.1%) and Highly Cited Papers (ESI 1%), China's Top 100 Most Influential Papers Published in International Journals 2014, Highlights and Most Download Papers of Smart Materials and Structures in 2014.

Shape memory polymer (SMP) is a novel smart polymer material that can autonomously recover to its original shape and size subjected to external stimuli such as heat, electric field, light, magnetic field and solution. SMPs have the advantages of large deformation, low density, low cost and aptness in large scale structures manufacturing and have wide application potential in aerospace, biomedicine, smart biomimetic fields and more. Researchers from School of Astronautics in HIT have made tremendous achievements in the syntheses, constitutive theories, and actuation methods of SMP and SMP composites, as well as their applications in space deployable structures.



Deployable hinge based on shape memory polymer composites

Variable-camber wing based on shape memory polymer skin



Shape memory polymer composites truss boom

The topical review introduced the general mechanism and stimulus methods of SMP and SMP composites and reviewed their aerospace applications in detail, including deployable hinges, trusses and morphing wings, the excellent various stiffness properties, good shape fixity and shape recovery behavior of SMP and SMP composites were demonstrated for aerospace application in the review. This work is supported by the National Natural Science Foundation of China.

Smart Materials and Structures is a multi-disciplinary journal with 12 issues each year, which publishes technical advances research and application of smart materials, systems and structures, including intelligent systems, sensing and actuation, adaptive structures and active control. ■

Reference

Yanju Liu, et al. Shape memory polymers composites and their applications in aerospace: a review. Smart Materials and Structures, 2014, 23 (2): 23001–23022

A COMPREHENSIVE UNDERSTANDING ON ULTRAFILTRATION MEMBRANE FOULING BY CYANOBACTERIAL METABOLITES

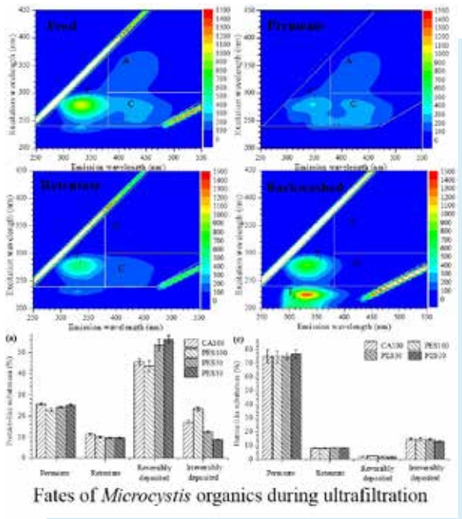
A team led by Professor Li Guibai and Liang Heng from the Department of Municipal and Environmental Engineering, Harbin Institute of Technology (HIT), in collaboration with professor Zhou Jian from the Department of Urban Construction and Environmental Engineering, Chongqing University, published a paper titled "Ultrafiltration Membrane Fouling Caused by Extracellular Organic Matter (EOM) from Microcystis Aeruginosa: Effects of Membrane Pore Size and Surface Hydrophobicity" in Journal of *Membrane Science* which is one of top journals on membrane science and technology. Substantial progress has been made by the team in understanding the ultrafiltration membrane fouling caused by cyanobacteria-released metabolites which was of great concern in cyanobacteria-laden water treatment.

Cyanobacteria, which can release toxins, odors and other metabolites, may bring in significantly adverse impacts to drinking water quality; pose an extensive threat to public health. Ultrafiltration can totally retain cyanobacterial cells without breaking the cells, but extracellular organics released by cyanobacterial cells may deposit on membrane surface, causing serve membrane fouling and thus hindering the application of the membrane technology. This work presents a comparative study on the impacts of membrane characteristics including pore size and surface hydrophobicity on the membrane fouling by cyanobacteria-released metabolites. A compressive membrane fouling evaluation method was applied to characterize flux decline, fouling reversibility, fates of different types of organics and fouling mechanism during filtration. The results reveal the substantial contributions of protein-like and polysaccharide-like fractions of cyanobacterial metabolites to membrane fouling and the dominance of cake filtration in fouling mechanism. Moreover, a guideline for cyanobacteria-laden water treatment using ultrafiltration membranes can be obtained that to choose relatively loose and hydrophilic membranes would help to improve fouling reversibility in the real application.

This research was jointly supported by National Natural Science Foundation of China, State Key Laboratory of Urban Water Resource and Environment and the Funds for Creative Research Groups of China. The corresponding author of this paper is Professor Liang Heng.

Reference

F Qu, et al. Ultrafiltration membrane fouling caused by extracellular organic matter (EOM) from microcystis aeruginosa: effects of membrane pore size and surface hydrophobicity. Journal of Membrane Science, 2014, 449(1):58-66

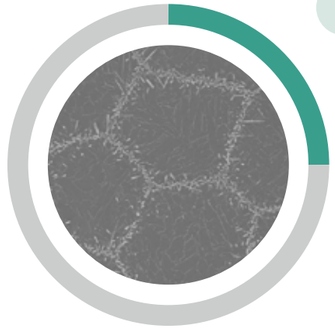


Fates of *Microcystis* organics during ultrafiltration

IS A HOMOGENEOUS REINFORCEMENT DISTRIBUTION OPTIMAL?

A team led by Professors Geng Lin and Huang Lujun from the School of Materials Science and Engineering in Harbin Institute of Technology (HIT) published a paper titled "Microstructurally Inhomogeneous Composites: Is a Homogeneous Reinforcement Distribution Optimal?" in the renowned materials journal *Progress in Materials Science*. This magazine mainly invites famous scientists in material science field to review the current status and suggest the future proposals for novel material research.

Theoretically, discontinuously reinforced titanium matrix composites (DRTMCs) possess higher specific strength, specific stiffness, especially for higher service temperature and wear resistance than titanium alloys, combining this with modest ductility, which render them to have extensive application potential in aerospace, weapon, automotive design and other such fields. However, in the past several decades, almost all the research has always pursued homogeneous reinforcement distribution in DRTMCs, which has resulted in a very low room-temperature damage tolerance, even high brittleness for DRTMCs fabricated by powder metallurgy (PM). Therefore, the most important problem impeding the practical application of DRTMCs is how to further improve their ductility, deformability and high temperature strength.



In order to effectively improve combination property of DRTMCs, Professors Huang and Geng firstly successfully designed and fabricated three-dimensional network architecture for DRTMCs by tailoring in-situ reinforcement spatial distribution. The network architecture it presents is microstructually inhomogeneous while being macroscopically homogeneous, therefore belongs to popular multi-scale hierarchical structure. The reinforcement in the network microstructure was still in-situ synthesized, moreover exhibited hierarchical branched structure, self-joining and mechanical locking structures. In addition, the network architecture can effectively refine and control grain size. Moreover, the controlled grains have no growth possibility in service and heat treatment processes therefore maintaining stable performance. This structure effectively corresponds to the well-known Hashin-Shtrikman upper bound that can exploit a superior strengthening effect. It is also equal to selectively introducing ceramic reinforcement into a titanium alloy grain boundary with gradient interface to remarkably enhance grain boundary strengthening and coordinative deformation ability. In summary, this smart design not only resolved the critical problem of extreme brittleness surrounding DRTMCs fabricated by PM to exhibit a superior ductility and deformability, but also significantly enhanced the strengthening effects at room temperature and high temperatures, therefore obtained much higher tensile strength, creepresistance and service temperature on the basis of titanium alloys. This work will remarkably widen the utilization field of DRTMCs. Based on this novel work, professors Huang and Geng received the invitation for writing an important review paper about tailoring composite microstructures. Another author is Peng Huaxin from Zhejiang University.

The paper was financially supported by the National Natural Science Foundation of China (NSFC), the High Technology Research and Development Program of China (863) and the Fundamental Research Funds for the Central Universities.

Reference

LJ Huang, L Geng, HX Peng. Microstructurally inhomogeneous composites: Is a homogeneous reinforcement distribution optimal? Progress in Materials Science, 2015, 71:93-168

BREAKTHROUGHS IN THE RESEARCH OF OPTICALLY TRANSPARENT HIGH TEMPERATURE SHAPE MEMORY POLYMERS

Shape memory polymers (SMPs) are stimuli-responsive smart materials with the ability to undergo a large recoverable deformation upon certain external stimulus (e.g. heat, electricity, light, magnetism, moisture and chemicals).

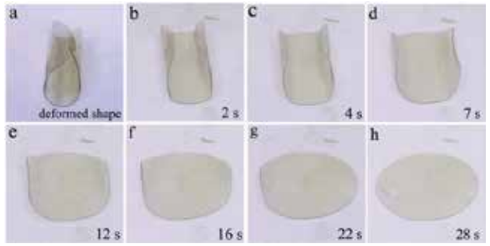
Dr. Xiao Xinli et al. published a paper titled "Optically Transparent High Temperature Shape Memory Polymer" (DOI: 10.1039/C5SM02703A) in Soft Matter as the Cover Paper. Optically transparent SMPs have potential in advanced optoelectronic and other common shape memory applications including wearable electronics, flexible display, biomedical devices, and optical devices, etc. Here optically transparent shape memory polyimide is reported for the first time. The polyimide possesses a glass transition temperature (Tg) of 171 ℃, higher than the Tg of other transparent SMPs reported, and the influence of molecular structure on Tg is investigated. The 120 μm thick polyimide film exhibits transmittance higher than 81% in 450-800 nm, and the possible mechanism of its high transparency is analyzed, which will benefit further research on other transparent high temperature SMPs. The transparent polyimide shows excellent thermomechanical properties and shape memory performances, and retains high optical transparency after many shape memory cycles.

This research was financially supported by National Natural Science Foundation of China Postdoctoral Science Foundation , and Fundamental Research Funds for the Central Universities. ■

Reference

X Xiao, et al. Optically transparent high temperature shape memory polymers. Soft Matter, 2016, 12(11):2894-2900

Demonstration of shape memory cycles in Soft Matter as the Cover Paper

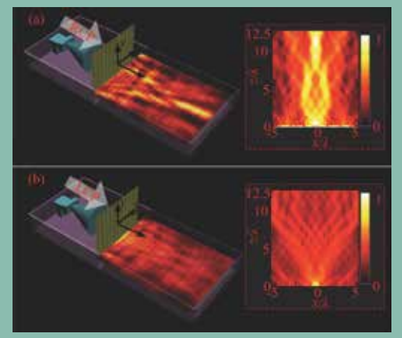


Demonstration of shape memory cycles of TSMPI. The sheet was deformed into a roll on 190 ºC hot-stage and the temporary shape was fixed by cooling, and it will recover its original shape upon heating.

BREAKTHROUGHS IN HIGH EFFICIENCY ULTRA-THIN METALENSES IN MICROWAVE REGION

A team led by Prof. Wu Qun and Associate Prof. Zhang Kuang from Department of microwave engineering in Harbin Institute of Technology (HIT) published a paper titled "Ultrathin Pancharatnam–Berry Metasurface with Maximal Cross-Polarization Efficiency" in the renowned material science magazine Advanced Materials. This work, completed under the cooperation of HIT, National University of Singapore, University of Texas at Austin and University of Paris-Sud achieved breakthroughs in both thickness reduction and efficiency enhancement of microwave metasurfaces. Dr. Ding Xumin is the co-first author, and Associate Prof. Zhang Kuang is the co-corresponding author of the paper.

Recent years have witnessed a great surge of interest in metasurfaces



providing phase-discontinuities. Compared to conventional lenses or imaging devices, metasurfaces provide an alternative approach on wave control and manipulation, thickness reduction, pixel refinement and transverse resolution. However, ultrathin metasurfaces operating in transmission face the challenge of intrinsically low anomalous transmission, as only a few percent of the total power of incident light gets processed by the metasurface, preventing the widespread use of these devices. Here, a planar ultra-thin metalens (≈ λ/1000 in thickness) was designed and experimentally verified, demonstrating an anomalous cross-polarization transmission efficiency reaching 24.7% in our proof-of-concept experiment, which is almost at the theoretically predicted upper limit 25% for ultra-thin surfaces. The polarization-dependent phase change is introduced and engineered by assembling Pancharatnam-Berry phase elements with spatially varying axis orientation. Due to its polarization-dependent phase engineering properties, such metalens also naturally exhibits bi-functionality. By controlling the handedness of the incident wave, in fact, converging and diverging functions are interchangeable using the same flat lens.

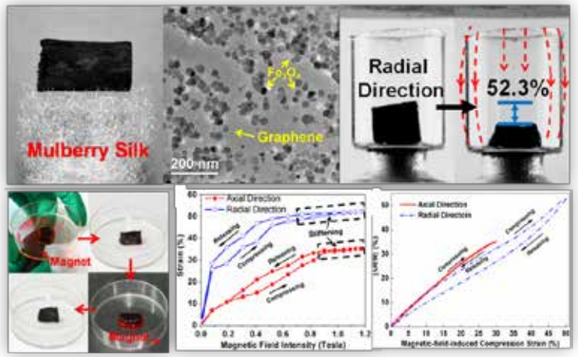
This paper is financially supported by National Science Foundation of China. ■

Reference

X Ding, F Monticone, K Zhang, L Zhang, et al. Ultrathin Pancharatnam-Berry Metasurface with Maximal Cross-Polarization Efficiency.Advanced Materials, 2015, 27(7):1195-1200

BREAKTHROUGHS IN SMART SOFT MATERIALS

Recently, the research group led by Professor Li Hui from School of Civil Engineering in Harbin Institute of Technology successfully created a kind of smart graphene aerogel material, which is reported as the lightest magnetic elastic material, and thus can be widely applied in many fields. The research findings have been published in the international journal *American Chemical Society Nano* (ACS Nano, 2015 impact factor of 13.33), titled "Self-Sensing, Ultralight and Conductive 3D Graphene/Iron Oxide Aerogel Elastomer Deformable in Magnetic Field".



They synthesized 3D graphene aerogels decorated with Fe_3O_4 nanoparticles (Fe_3O_4/GA) by self-assembly of graphene with simultaneous decoration by Fe_3O_4 nanoparticles using a modified hydrothermal reduction process. The aerogels exhibit an up to 52% reversible magnetic field-induced strain and strain-dependent electrical resistance that can be used to monitor the degree of compression/stretching of the material. The density of Fe_3O_4/GA is only about 5.8 mg cm^{-3}, making it an ultralight magnetic elastomer with potential applications in self-sensing soft actuators, micro-sensors, micro-switches and environmental remediation.

At present, scholars in China and abroad mainly focus their graphene aerogel research on aspects of mechanical compression, electrical conduction, and electro-chemical catalysis and absorption properties. Research on the intelligent aspects of controllability, drive capacity and dynamic response inspired by the external load of an electric and magnetic field is relatively rare. Professor Li's research group has adopted the improvement of the hydro-thermal method, via insitu deposition of super-paramagnetic Fe_3O_4 nanoparticles in the self assembly process of graphene oxide, taking the lead in research and realization of graphene aerogel's intellectual characteristics such as deformation and electroresistive effect under the inducement of the outer directional magnetic field. This has provided a new method for the research of intelligent graphene aerogel material turning into magnetic elastic material. The material can widely be applied in areas of self sensing actuators, micro switches, valve, oil products, remote absorption of heavy metal iron, as well as energy storage and dissipation.

The paper was financially supported by the Ministry of Science and Technology, China. ■

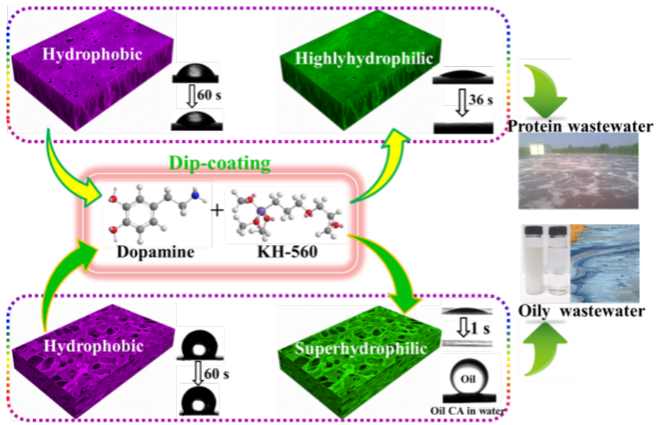
Reference

X Xu, H Li, et al. Self-Sensing, Ultralight, and Conductive 3D Graphene/Iron Oxide Aerogel Elastomer Deformable in a Magnetic Field. Acs Nano, 2015, 9(4):3969-77

BREAKTHROUGHS IN THE RESEARCH OF WASTEWATER TREATMENT MATERIAL

A team led by Professor Shao Lu from the School of Chemistry and Chemical Engineering in Harbin Institute of Technology (HIT) focused on design and developing advanced membranes for CO_2 capture, enrichment of H_2 or CH_4, pharmacy separation, wastewater treatment and oil/water separation. Recently the team published a highly cited paper titled "Mussel-Inspired Tailoring of Membrane Wettability for Harsh Water Treatment" in the Journal of Materials Chemistry A. The team developed a highly efficient one-step surface immobilization strategy for tailoring of membrane wettability for harsh water treatment.

Mussel inspired surface modifications via co-deposition of polydopamine (pDA) and other peculiar molecules have attracted considerable interest for its stability, simplicity and versatility. However, those methods are usually limited to either polar organic molecules, ultrahigh molecular weight polymer or molecules with amine/thiol groups. In fact, most of those molecules are very expensive and difficult to obtain, such as zwitterionic peptides and dextran with ultrahigh molecular weight, which will definitely limit the application of those methods. This paper developed a new kind of co-deposition strategy for functionalization of membrane surface via simultaneous polymerization of dopamine and hydrolysis of commercially available and low-cost silane. Due to the similar reactive conditions (alkaline conditions), the hydrolysis/condensation of silane and self-polymerization of dopamine can be achieved simultaneously in an alkaline aqueous solution. During this one-step process, hydrolysis/condensation products with abundant hydrophilic groups can be co-deposited on membrane surfaces with pDA via hydrogen bonding and physical entanglement, forming hybrid functional coatings. The hybrid coatings can not only endow ultrafiltration (UF) membranes with high hydrophilicity and excellent dry storage ability, but also render microfiltration (MF) membranes superhydrophilic and underwater superoleophobic. The developed unique UF and MF membranes can be deployed for treating protein-rich water with drastically enhanced functions and separating oily water (oil-in-water emulsion) under atmospheric conditions with ultrahigh water flux and superior antifoulingabilities.



Besides tailoring surface hydrophilicity, the multi-functionalized dopamine coatings were proved effective in tailoring pore size of loose polyethylene glycol (PEG) based NF membranes as well. Interestingly, when combined with PEG based selective layer, a hydration layer formed on the surface of dopamine modified PEG based NF membranes during the separation process, limiting the fouling of membranes. The membranes were proved effective in separation of antibiotics (400-600 g mol^{-1}) from water. A novel positively charged nanofiltration (NF) membrane has also been fabricated via a highly efficient mussel-substance-simulated co-deposition of cheap catechol and branched polyetheylenimine (PEI) onto substrates facilely. Such co-deposited NF membrane demonstrates efficient removal capacity in relation to common salts, dyes and heavy metal ions common to wastewater treatment. Our membranes exhibit high removal efficiency toward cationic dye and metal ions due to the Donnan effect. These series of work published in Journal of Membrane Science and Chemical Engineering Journal. Furthermore, dopamine was used to cross-link with PEG for fabricating CO_2-selective membrane to capture CO_2. After cross-linking and post-immersion with low molecular PEG, the novel membranes are highly effective for CO_2 capture. This work published in Journal of Materials Chemistry A as well.

These works were supported by National Natural Science Foundation of China, the Program for New Century Excellent Talents in University and State Key Laboratory of Urban Water Resource and Environment. ■

Reference

ZX Wang, CH Lau, NQ Zhang, YP Bai, L Shao. Mussel-inspired tailoring of membrane wettability for harsh water treatment. Journal of Materials Chemistry A, 2015, 3(6):2650-2657

BREAKTHROUGHS IN FLEXIBLE ELECTROKINETIC MANIPULATION OF MICRO-NANO PARTICLE

A group led by Professor Jiang Hongyuan and Associate Professor Ren Yukun from the School of Mechatronics Engineering, Harbin Institute of Technology (HIT) published a paper titled "Induced-Charge Electro-Osmotic Trapping of Particles" in the renowned fluid and plasma physics journal Lab on a Chip. The team achieved breakthroughs in flexible electrokinetic manipulation of micro-nano particle samples in modern microfluidic systems.

Many biological samples such as bacteria and biomacromolecule are of negligibly small gravity due to their submicron size. To flexibly manipulate small-gravity particle samples dispersed in liquids is a great challenge, and has sparked wide interest in both basic research and novel applications, such as biosensors, microactuators and micro/nano fluidics.

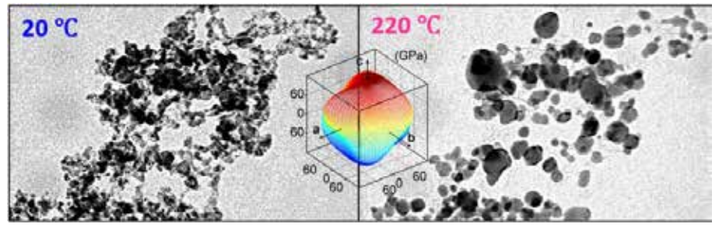
Since it can persist in a low-frequency AC field while avoiding electrode reactions and bubble generation, induced-charge electroosmotic (ICEO) flow serves as an important method for pumping and mixing in microfluidic lab-on-chip systems. However, the paper aimed at studying the physics underlying particle trapping at the center of floating electrode surface using ICEO convective vortex, and revealed a nonlinear ICEO slip profile on the floating electrode accounting for stable particle trapping behaviors above the double-layer relaxation frequency. Besides, since conventional electrokinetic manipulation methods cannot flexibly move particles, by adjusting the gate voltage, this paper achieved arbitrary symmetry breaking in flow profile of ICEO above the surface of gate electrode, and proposed the alternating current-flow field effect transistor (AC-FFET) excited state of nonlinear electro-osmosis. In particular, the application of high-frequency asymmetric AC-FFET vortex flow helps to enable position-controllable trapping of yeast cells above the gate electrode surface in static flow condition, which greatly improves the flexibility of electrokinetic particle manipulation. These results suggest that ICEO may be one powerful tool that contributes to particle sample manipulation in microfluidics and nanofluidics.

The work was financially supported by the National Natural Science Foundation of China and Self-Planned Task of State Key Laboratory of Robotics. ■

Reference

Y Ren, et al. Induced-charge electroosmotic trapping of particles. Lab on A Chip, 2015, 15(10):2181-2191

BREAKTHROUGHS IN ELECTRONIC PACKAGING MATERIAL AND TECHNOLOGY



The team led by Prof. Wang Chunqing from State Key Laboratory of Advanced Welding and Joining, Harbin Institute of Technology, published a paper titled "Low Temperature Sintering Cu_6Sn_5 Nanoparticles for Superplastic and Super-Uniform High Temperature Circuit Interconnections" in the renowned Journal *Small*, collaborating with Prof. Sungho Jin from Materials Science and Engineering, University of California at San Diego. The team presented the breakthrough approach of turning the typically unwanted, hard and brittle Cu_6Sn_5 intermetallic compound material into a quite desirable and superior high-temperature circuit connection material with stress-accommodating properties via nano route.

Modern electronic packaging with smaller size solder bonding for higher device density increases the burden of carrying significantly larger current densities. In order to enhance the resistance to the electromigration/thermomigration and fatigue failures in solders, mechanically and thermally more stable solder materials are desirable. Via sub-10 nm nano route and confirmed by in situ TEM heating in this paper, brittle intermetallic compounds (IMCs) like Cu_6Sn_5 can be transformed into low cost, non-brittle and high temperature-resistant interconnection material by sintering at temperatures more than 200 ℃ lower than its bulk melting point. The low temperature sintered structure is pore-free with nanograins, and the interface is super-uniform, making nano-IMCs the holy grail of resolving the contradiction between low temperature processing and high temperature resistance. This breakthrough offers a bright future for ultra-high-density and ultra-high temperature interconnections for third generation semiconductors, flexible and wearable electronic devices, 3D packaging, and system in packaging (SiP), etc.

This paper was supported by National Natural Science Foundation of China, Iwama Endowed Fund at UC San Diego and grants from the Power Electronics Science and Education Development Program of Delta Environmental & Educational Foundation. ■

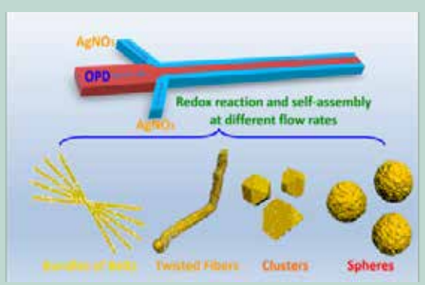
Reference

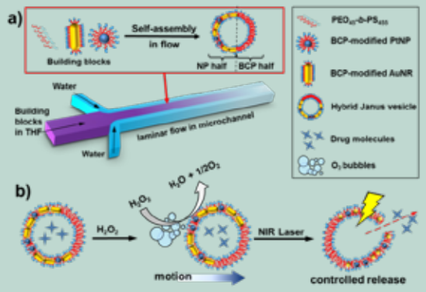
Y Zhong, R An, C Wang, et al. Low temperature sintering Cu6Sn5 nanoparticles for superplastic and super-uniform high temperature circuit interconnections. Small, 2015, 11(33):4097-4103

NEW PROGRESS ON MICROFLUIDICS

With the support of the National Natural Science Foundation of China, Prof. Han Xiaojun's group has achieved a series of breakthroughs in microfluidics. His paper "Continuous Microfluidic Self-Assembly of Hybrid Janus-Like Vesicular Motors: Autonomous Propulsion and Controlled Release" was published in *Small* (DOI:10.1002/smll.201500527). Meanwhile, his paper of "Morphology-Controlled Synthesis of Ag Nanoparticle Decorated Poly (o-phenylenediamine) Using Microfluidics and Its Application for Hydrogen Peroxide Detection" was published in *Chemical Engineering* Journal (DOI:10.1016/j.cej.2015.01.021) and highlighted on the front cover.

Microfluidic technique has developed rapidly in recent years. It has been widely applied in the fields of lab-on-a-chip and nanomaterial synthesis. Its advantages are the accurate control of the reaction conditions and the small quantity of sample needed. The authors took these advantages of the microfluidic technique to synthesize the hollow Janus vesicles and morphology controlled o-phenylenediamine/silver nanocomposites by varying the sample flow rates. The Janus vesicles contain half sphere of block copolymer and half





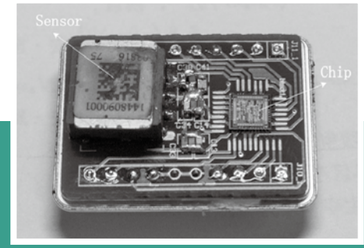
sphere of block copolymer modified nanomaterials. Janus vesicles containing Pt nanoparticles/gold nano rods were used as a micro motor using H_2O_2 as a fuel. They can also load anticancer drugs as drug carriers, which can be triggered by near infrared light to release drugs in a controlled manner. The morphologies of o-phenylenediamine/silver nanocomposites were precisely controlled to be belt, twist fiber, cluster and nanosphere respectively in a microfluidic chip.

Professor Han Xiaojun is the head of the Department of Biomolecular and Chemical Engineering. He is the principal investigator of 12 research grants including two from the National Natural Science Foundation of China. He was appointed as a New Century Excellent Talent in 2009. So far, he has published 83 papers in international journals including Adv. Mater., J. Am. Chem. Soc., Angew. Chem. Int. Ed. etc. He wrote four book chapters and owns 18 national invention patents. ■

Reference

L Wang, Y Liu, J He, et al. Continuous microfluidic self-assembly of hybrid janus-like vesicular motors: autonomous propulsion and Controlled Release. Small, 2015, 11(31):176-191

INNOVATION DESIGN OF SIGMA DELTA INTERFACE FOR HIGH-Q MICROMECHANICAL CAPACITIVE ACCELEROMETERS



The team led by Professor Liu Xiaowei from the Department of Micro Electronics, Harbin Institute of Technology (HIT), published a paper titled "A Closed-Loop Sigma Delta Interface for a High-Q Micromechanical Capacitive Accelerometer with 200 ng/root Hz Input Noise Density" in the renowned electronics engineering magazine IEEE Journal of Solid-State Circuits, 2015.

MEMS accelerometers are often used in inertial navigation, GPS-aided navigators, tilt control and platform stabilization. Among them, the high-resolution capacitive accelerometers are becoming popular for their low noise, low cost and high sensitivity. These advantages expanded its applications to various consumers and military markets.

In this paper, the team achieved a closed-loop interface circuit with high precision, which the measured capacitive accelerometer showed a good figure of merit. The paper introduces a fully-differential and high-order sigma-delta interface of switched-capacitor. It is fabricated by a standard CMOS technology for micromechanical capacitive accelerometers. The highlight of design is low-noise front-end and the stability control of the high-order system. The system includes a micromechanical capacitive sensor element with high quality factor (high-Q) and a back-end third-order switched-capacitor $\Sigma\Delta$ modulator. The proposed interface circuit helps to improve weak signal detection. In particular, the stability control and design of high-order closed-loop system with high-Q in this paper provide a new view to improve the interface circuits of high-resolution sensors. Moreover, high-precision accelerometer of this kind of design can enhance the quality of oil exploration and increase earthquake monitoring levels.

In recent years, the team makes achievements in academic fields of interface circuit of inertial device, MEMS energy, micro-nano device & system, as well as Internet of Things. Besides, ASIC chip and the Internet of Things technology have been used for industrialization. It is worth recalling that the program "Investigation of Nano Effect on Movement Interface of Micro-Nano Inertial Device" undertaken by the team leader Liu Xiaowei as chief scientist is the first 973 project of HIT for civil use.

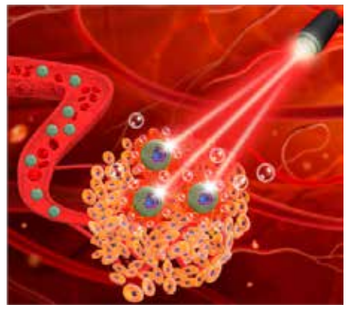
Reference

H Xu, X Liu, L Yin. A closed-Loop interface for a high-Q micromechanical capacitive accelerometer with 200 ng/ Hz input noise density. IEEE Journal of Solid-State Circuits, 2015, 50(9):2101-2112

RED BLOOD CELL-MIMICKING MICROCAPSULES KILL CANCER BY VAPOR BUBBLE GENERATION

Professor He Qiang's group from Academy of Fundamental and Interdisciplinary Science, Micro/Nano Technology Research Center, Harbin Institute of Technology published a paper titled "Near-Infrared-Activated Nanocalorifiers in Microcapsules: Vapor Bubble Generation for In Vivo Enhanced Cancer Therapy" in the internationally renowned journal Angewandte Chemie International Edition. The group reported a tumor-penetrable, biodegradable gold nanorod-assembled capsule by mimicking red blood cells for enhanced photothermal therapy as proved by in vitro and in vivo experiments.

Since 1998, Professor H. Möhwald from Max Planck Institute of Colloids and Interfaces launched the research of the hollow polymer multilayer microcapsules based on controlled molecular self-assembly. Such polymeric multilayer microcapsules as a new class of drug carriers have sparked wide interest due to their controllable geometry, composition, and corresponding functionality. During the past decades, great efforts have been devoted on the research of basic physical and chemical properties of microcapsules or drug delivery in vitro. However, the capsules with microscale sizes were expected to achieve minor penetration into the tumor tissues, which limits their therapeutic applications in vivo.



Generally, particles with a size of above 200 nm can be rapidly cleared from the blood circulation and mainly taken up by the liver, spleen and other reticuloendothelial system. In contrast, microsized red blood cells can easily pass through dimensions smaller than their sizes and participate in body circulation due to their deformability. Learning from red blood cells, Prof. He Qiang's team achieved significant breakthrough in the penetration of microcapsules into tumor tissue. The gold nanorod-assembled microcapsules show excellent deformability ability simlar to that of natural red blood cells.

Moreover, the polymeric microcapsules allow for dense packing of nanorods. Gold nanorods as nanocalorifiers form a collecting thermal effect upon near-infrared irradiation, which induces the generation of vapor bubbles around the excited microcapsules. The rapid expansion of the bubble volume induced tearing and destroying the tumorous cells, resulting in irreversible physical damage and the collapse of the tumor tissue. According to both experimental results and theoretical simulations, the explosive vapor bubbles can only be generated when reaching critical laser confluence.

The in vivo experiments demonstrate that microcapsules could cross biological barriers owing to their excellent deformability ability like that of red blood cells and localize at targeted tumor tissues, followed by effective suppression tumor growth and metastasis with negligible toxicity. Because of the advantages including biological friendliness and credible safety, this finding will pave a way to develop vapor bubble mediated photothermal therapy and promote the application of soft-polymer microcapsules in the fields of clinical antitumor therapy.

This work was supported by National Nature Science Foundation of China and Fundamental Research Funds for the Central Universities. ■

Reference

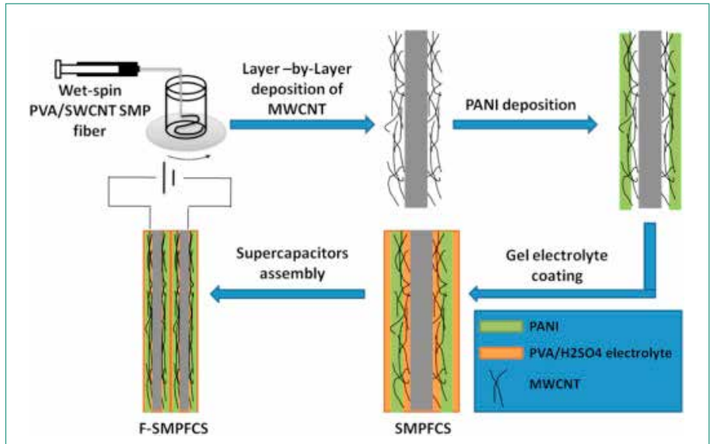
J Shao, M Xuan, L Dai, et al. Near-infrared-activated nanocalorifiers in microcapsules: vapor bubble generation for in vivo enhanced cancer therapy. Angewandte Chemie, 2015, 54(43):12782-7

BREAKTHROUGHS IN SHAPE MEMORY SUPERCAPACITORS

Carbon nano-tubes and graphene are two typical nanomaterials which are made up of sp2 hybridized carbon atoms, with superior mechanical, electrical, thermal and chemical stability. It is still a hot research topic and a multidisciplinary field creating these types of nanomaterials and preparing the macroscopic materials with corresponding superior physical and chemical properties. This research has much potential in applications such as structural engineering, energy engineering and other fields.

The research group led by Professor Li Hui from School of Civil Engineering, Harbin Institute of Technology published a paper titled "Shape Memory Fiber Supercapacitors" in *Nano Energy* (2015 IF: 11.553).

Smart energy storage materials, which not only store electrochemical energy but also exhibit sensitivity to environmental stimuli, can provide novel multi-functionalities. In this work, the authors report a smart shape memory



fiber supercapacitor constituted with a highly stretchable shape memory polymer nanocomposite fiber substrate, multi-walled carbon nanotubes (MWCNT) conductive layer and pesudocapacitive polyaniline layer. The resultant shape memory polymer supercapacitors (SMPFSCs) not only possess shape memory properties, but also exhibit outstanding energy storage performance, exceeding the current best pseudo-capacitance. Such design strategies can also be extended to other polymer substrates, and could open the door to smart (multi-functional) supercapacitor technologies.

The paper was financially supported by the National Natural Science Foundation of China and the USA National Science Foundation. ■

Reference

J Zhong, J Meng, Z Yan, et al. Shape memory fiber supercapacitors. Nano Energy, 2015, 17:330-338

BREAKTHROUGHS IN CONTROL OF MICROBIOLOGICAL CONTAMINATION IN DRINKING WATER

Professor Wang Wei and Professor Cui Fuyi from the State Key Laboratory of Urban Water Resource and Environment (SKLUWRE), School of Municipal and Environmental Engineering, Harbin Institute of Technology, published a paper titled "Highly Efficient Phosphate Scavenger Based on Well-Dispersed La $(OH)_3$ Nanorods in Polyacrylonitrile Nanofibers for Nutrient-Starvation Antibacteria" by the American Chemical Society's peer-reviewed, in the scientific journal ACS Nano on August 20, 2015.

The research concerned the control of microbiological contamination in drinking water by phosphate–starvation. A general method to limit microbial growth is the addition of excess disinfectants, yet the toxicity of disinfection byproducts leads to a quest for alternative solutions. Although, there has been a huge advancement in new types of antibacterial materials, most of them react with living cells by releasing toxic substances and result in health risks in drinking water. In this research, well-dispersed $La(OH)_3$ nanorods were immobilized in polyacrylonitrile fibrous matrix (PLNFs) and then applied as a highly efficient phosphate scavenger to realize nutrient-starvation antibacteria. The encapsulation by PAN fibers can both avoid lanthanum leakage and bring out higher removal efficiency toward nutrient. The present development provides a promising antimicrobial solution for practical drinking water security with a negligible environmental footprint.

The paper was financially supported by the National Natural Science Foundation of China and Fundamental Research Funds for the Central Universities.

Reference

J He, W Wang, et al. Highly efficient phosphate scavenger based on well-dispersed La(OH)3 nanorods in polyacrylonitrile nanofibers for nutrient-starvation antibacteria. Acs Nano, 2015, 9(9):9292-302

BREAKTHROUGHS IN SOLID STATE SYNTHESIS OF NANO-SIZED ALH_3

Professor Hu Lianxi from the Department of Materials Processing and Engineering, Harbin Institute of Technology, and his research group made important progress in production methods of nano-sized aluminum hydride (AlH_3). The research paper "Solid State Synthesis of Nano-Sized AlH_3 and Its De-hydriding Behaviour" was published in the renowned chemistry science journal *Green Chemistry* on April 20th, 2015. The group achieved breakthroughs in synthesizing nano-sized γ-AlH_3 by the solid state mechanochemical route using MgH_2 and $AlCl_3$ as reagents.

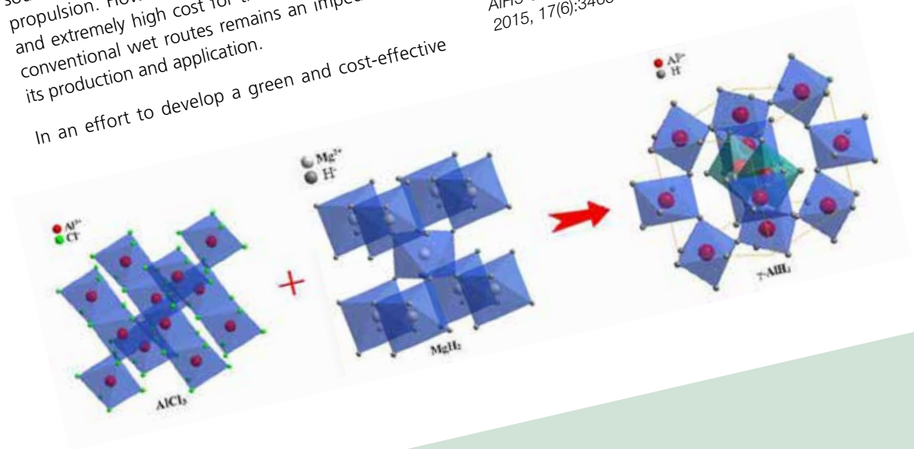
AlH_3 is a metastable metal hydride with a high gravimetric hydrogen capacity (10.1wt%) and relatively lower hydrogen desorption temperature (100-200°C). It has attracted considerable attention for its potential as a promising candidate for advanced hydrogen storage or as a hydrogen source material in applications such as fuel cells or propulsion. However, the complexity in processing and extremely high cost for the synthesis of AlH_3 by conventional wet routes remains an impediment to its production and application.

In an effort to develop a green and cost-effective way to synthesize AlH_3, the mechanochemical process was investigated by using cheap metal hydrides and aluminum chloride as reagents. The paper demonstrated that nano-sized γ-AlH_3 was successfully mechanochemically synthesized with the use of commercial $AlCl_3$ and home-made nanocrystalline MgH_2 powders, and no hazardous solvent was involved in the process. X-ray diffraction (XRD), transmission electron microscopy (TEM), and nuclear magnetic resonance spectrometry (NMR) analysis confirmed that the as-synthesized sample was composed of nano-sized γ-AlH_3 and some reaction by-product $MgCl_2$. By dehydriding tests, it was found that the hydrogen desorption capacity of the nano-γ-AlH_3 achieved as high as 9.71wt%.

The corresponding author for this paper is Prof. Hu Lianxi, and the first author is PhD Duan Congwen under supervision of Prof. Hu Lianxi.

Reference

C Duan, H Hu, D Xue. Solid state synthesis of nano-sized AlH3 and its de-hydriding behaviour. Green Chemistry, 2015, 17(6):3466-3474

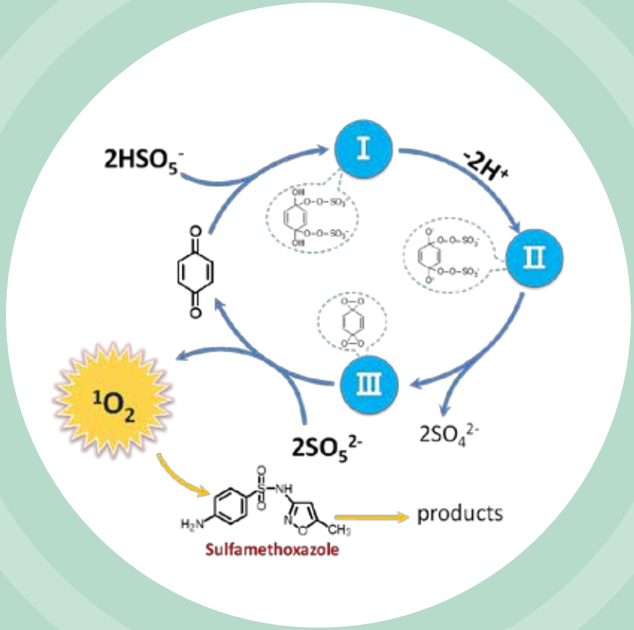


A NOVEL NON-RADICAL OXIDATION PROCESS FOR DRINKING WATER PURIFICATION

A team led by Professor Ma Jun and Professor Jiang Jin from State Key Laboratory of Urban Water Resource and Environment, Harbin Institute of Technology (HIT) published a paper titled "Activation of Peroxymonosulfate by Benzoquinone: A Novel Non-Radical Oxidation Process" in the renowned magazine *Environmental Science & Technology* as highlight article.

Advanced oxidation processes (AOPs) based on peroxides (peroxymonosulfate, hydrogen peroxide and peroxydisulfate) are widely used for the remediation of contaminated water and soil. The activation of these peroxides by transition metal and energy (e.g. heat, ultraviolet and ultrasound) could generate sulfate radical and hydroxyl radical, with high standard redox potentials, for the removal of persistent organic pollutants.

Recently, activation of peroxides by quinones drew more attention from researchers. Quinones are a group of highly reactive organic compounds which widely existed in environment and may have significant impacts on the application of these peroxides. This research demonstrated that peroxymonosulfate could be activated by benzoquinone for the degradation of organic pollutant but neither sulfate radical nor hydroxyl radical was produced therein. Finally, singlet oxygen ($^1O_2$) was proved as the primary oxidizing species from the reaction of peroxymonosulfate with benzoquinone. A non-radical mechanism for the activation of peroxymonosulfate by benzoquinone was proposed involving the formation of a dioxirane intermediate between peroxymonosulfate and benzoquinone and the decomposition of this intermediate into $^1O_2$. Accordingly, a kinetic model was proposed, which could well describe the reaction of peroxymonosulfate with benzoquinone.



As a moderately reactive electrophile, $^1O_2$ may suffer less interference from background organic matters compared to non-selective sulfate radical and hydroxyl radical. These findings may have important implications for the development of $^1O_2$ based PMS oxidation processes for selective contaminant remediation or bacterial inactivation, as well as for the potential application of in situ peroxymonosulfate oxidation of soils and sediments, where quinone-like groups containing natural organic matters are ubiquitous.

This paper was financially supported by the National Science & Technology Pillar Program, China. ■

Reference

Y Zhou, J Jiang, Y Gao, J Ma, et al. Activation of peroxymonosulfate by benzoquinone: a novel nonradical oxidation process. Environmental Science & Technology, 2015, 49(21):12941-50

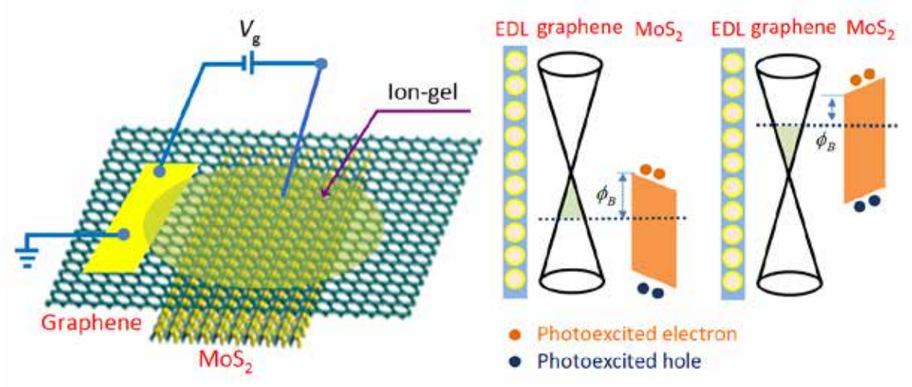
MOS_2/GRAPHENE VAN DER WAALS HETEROSTRUCTURES: EXCITONS MODULATED BY ELECTROCHEMICAL GATING

The van der Waals (vdWs) heterostructures, comprised by two-dimensional (2D) materials such as graphene, transition metal dichalcogenides (TMDs) and h-BN, have atomically sharp, high-quality interface with no dangling bonds regardless of substantial lattice mismatch, rendering them as an ideal platform to tailor the behavior of excitonic states, including the generation, dissociation, transfer, and recombination of excitons. In vdWs heterostructures, apart from the carrier density of counterparts, the band alignment at the hetero-interface may also affect the photoluminescence properties. However, to what extent the carrier densities of counterparts and band alignment at the hetero-interface in vdWs heterostructures determine the photoluminescence properties still remains unclear.

By modulating both carrier densities of counterparts and band alignment at the hetero-interface by gating, Prof. Zhen Liang and his collaborators from the School of Materials Science and Engineering found that the photoluminescence properties of monolayer MoS_2/graphene heterostructures could be significantly tuned. Upon extracting the carrier density of MoS_2 by electric potential distribution model and the Schottky barrier by first-principle calculation, it was demonstrated that the variation of carrier density in MoS_2 played a dominant role on the PL modulation at negative gate bias, while exciton separation at the interface induced by Schottky barrier had a major contribution at positive gate bias. Besides, the insertion of insulate self-assembled monolayers (SAMs) between MoS_2 and graphene weakens the tunability of photoluminescence property, which is attributed to the increased tunneling barrier at the interface and redistribution of screening field across MoS_2/SAMs/graphene. These findings may benefit to better understanding and exploiting interesting physics and devices with new concept related with hetero-interface and many body interactions in van der Waals heterostructures. ■

Reference

Yang Li, et al. Tuning the Excitonic States in MoS2/Graphene van der Waals Heterostructures via Electrochemical Gating. Advanced Functional Materials, 2016, 26(2):293-302



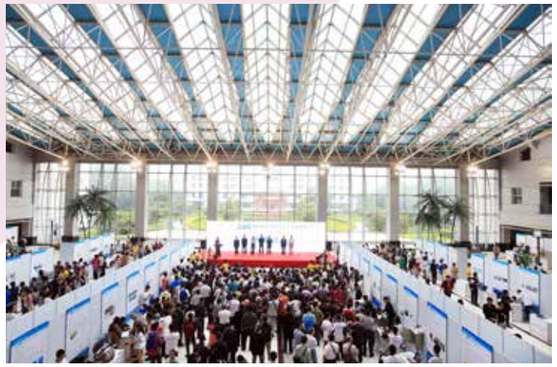
NEWS & **EVENTS**

THE 95TH ANNIVERSARY OF HARBIN INSTITUTE OF TECHNOLOGY

On June 7, Harbin Institute of Technology (HIT) celebrated the 95th Anniversary. Three campuses including main campus in Harbin, HIT Shenzhen Graduate School and HIT Weihai campus simultaneously held a National Flag-raising Ceremony.

With 95 years of glorious history, HIT will continue to explore new research frontiers and scale greater heights in research excellence. HIT has its own standard of cultivating talent, academic research, international collaboration, faculty development and administration management etc. Education is a fundamental element for the sound and rapid development of China's economy and society. Therefore HIT should continuously make efforts to improve the quality of education and make contribute to the nation.

The university is experiencing reform and progress as it aspires to become one of the highest ranked universities in the world. HIT must enhance the capability of research and innovation by launching the five-year plan of "Greeting the Centennial Anniversary, Being World-Class". We have a "China Dream" of realizing the national rejuvenation and a "HIT Dream" of constructing world-class university. All the students and faculty have responsibility to make dreams come true. No matter how difficult it is, we must blaze a trail in education with Chinese characteristics and HIT's standard.■



THE 8TH NATIONAL CONFERENCE OF UNDERGRADUATE ON INNOVATION AND ENTREPRENEURSHIP HELD

On September 19 and 20, Harbin Institute of Technology (HIT) hosted the 8th National Conference of Undergraduate on Innovation and Entrepreneurship sponsored by China's Ministry of Education. The theme was "Youth, Dream, Innovation and Entrepreneurship". About 1,100 people from 230 universities and organizations gathered in HIT to discuss entrepreneurship education and practice.

Four of HIT's five projects won awards, which was our best record so far. The "Organization Structure and Thermoelectric Performance of AgNaxSb1-xSe2" written by Cai Songting from the School of Materials Science and Engineering and "SERS In-Situ Study of Surface Plasmon's Induced Catalysis to Nitration Reaction of Benzene" written by Wei Huang from the Department of Chemistry were awarded "Excellent Academic Paper" prizes. The "Automatic Cooking Machine" designed by Zhang Yuxing from School of Mechatronics Engineering was awarded the "My Favourite Project" prize. The "Handheld Electromagnetic Ultrasound Flaw Detector" created by Zhao Hui from the School of Electrical Engineering and Automation was awarded the "Excellent Venture Project" prize. 27 "Excellent Academic Paper" prizes, 16 "My Favourite Project" prizes, 15 "Best Creative Project" prizes, 6 "Excellent Venture Project" prizes and 13 "Most Discerning Project" prizes were awarded.

The conference showed the latest results of innovation and entrepreneurship comprehensively through lectures, academic reports, innovative projects presentation, entrepreneurial promotion, seminars and recreational activities. 1633 projects had been received, including 756 academic papers from 491 universities, 721 innovative entrepreneurial showcase projects and 156 innovative entrepreneurial promotion projects. Moreover, 13 academic papers and innovative entrepreneurial showcase projects were from Russia and Macao Special Administrative Region. Experts from 36 "985" universities and National Undergraduate on Innovation and Entrepreneurship Training Program eventually selected 180 academic papers, 150 innovative entrepreneurial showcase projects and 45 innovative entrepreneurial promotion projects to participate in the conference.

Since it was launched in 2008, the annual conference has become one of the high-level national undergraduate teaching reform events with the most extensive coverage, the tremendous impact and the largest number of participants. Up to now, HIT has been among the front rankings with 30 projects chosen and 9 of them given awards. ■

2015 DOCTORAL HOODING CEREMONY HELD

On July 7, the Doctoral Hooding Ceremony was held to honor doctoral graduates and celebrate the successful completion of their studies.

President Zhou Yu delivered a speech. Vice President Ding Xuemei chaired the ceremony, and read the Harbin Institute of Technology Academic Degrees Committee decisions of doctoral degrees presentation. According to the 154th meeting of the Academic Degree Committee, 283 students obtained their doctorate degrees, 30 in Science, 239 in engineering, and 14 in management. ■

'2015 RESEARCH AND INNOVATION TOUR: WHERE EUROPE AND CHINA CONNECT' HELD

On September 23, "2015 Research and Innovation Tour: Where Europe and China Connect" was hosted in Harbin Institute of Technology (HIT). After visiting the HIT Air & Space Museum, Delegation of the European Commission to China presented an information session, introducing EU's Science and Technology Innovation Policy and the collaborations with China. Delegates from France, Switzerland, Slovakia and Malta introduced the profile of science and technology and shared their experience. HIT Teacher representatives narrated their research experience in Europe. The participants also exchanged ideas extensively with the diplomatic corps on other common topics.

This event was one of the celebrations for the 40th anniversary of the China-EU diplomatic relations, jointly organized by CSTEC and Delegation of the European Commission to China. After being launched in WuHan, the related activities were held in 16 cities of 14 provinces. ■

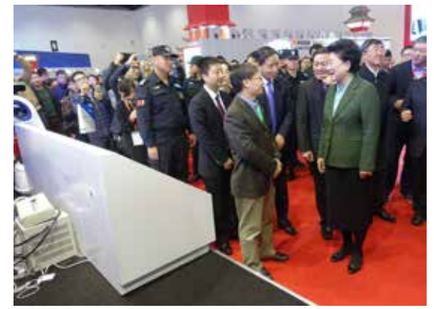
INTERNATIONAL STUDENTS GRADUATION CEREMONY HELD

On 19 June 2015, International Students Graduation Ceremony was held in Harbin Institute of Technology.

The development of the HIT's international student service was rapid in the last decade. Compared to 2005, the total number of international students from more than 110 countries is doubled in 2014, reaching 2300. The number of students with diploma increased approximately 10 times, from 100 to 1200. In 2013 HIT was selected to be the first batch of Demonstration Bases for Study in China by the Ministry of Education.

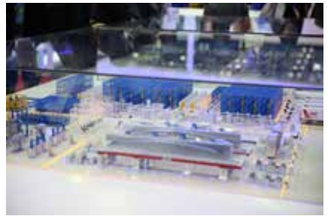
In China's Higher Education Annual Meeting – Management of International Students Annual Conference 2014, HIT was awarded the "Advanced Group of International Education". Up to now, 5000 international students graduated from HIT and they become friendly alumni all over the world, who contribute to the world peace and the development of civilization.■

HIT ROBOT PRODUCTS EXHIBITED IN THE WORLD ROBOT CONFERENCE



On November 23 to 25, the "World Robot Conference 2015" was held in China National Convention Centre, which was co-organized by the China Association for Science and Technology (CAST), Ministry of Industry and Information Technology of the People's Republic of China and the Government of Beijing. President Xi Jinping wrote a letter to the Opening Ceremony. Premier Li Keqiang sent a note of congratulations.

More than 100 domestic and international enterprises participated in the robot expo, showcasing their leading robotic products. HIT's Robotics Institute and HIT Robot Group also partook in the expo. HIT's Robotics Institute showed their "Dexterous Hand" and HIT Robot Group displayed more than ten robot products and several intelligent devices from six



categories including the wisdom factory system, industrial robots, specialized robots, service robots, new intelligent equipment and intelligent cloud robotics, with a wide range of fields such as production, living, education, service, national defense and many others.

The World Robot Conference is the first international conference in robotics industry held by China, aiming to embody global intelligence expertise and develop technology innovation. 12 international robotic organizations and 58 domestic institutes participated in this conference. Over 100 experts and scholars from more than 10 countries and areas partook in the keynote session and panel discussion. 145 youth teams from 16 countries and areas participated in the two-day World Adolescent Robot Contest 2015 (WARC 2015).

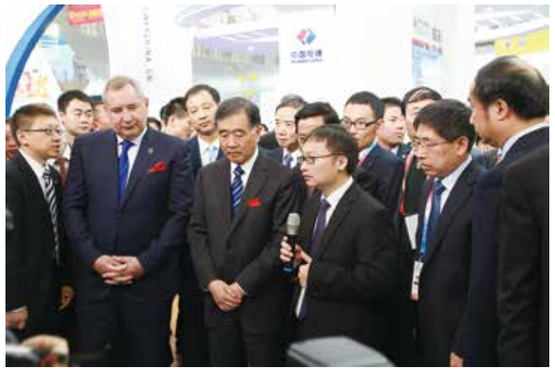
Vice President Li Yuanchao, Vice Premier Liu Yandong, Vice-Chairman of the CPPCC National Committee and President of China Association for Science Han Qide and other officials visited HIT's exhibition area. Party Secretary of HIT Wang Shuquan and Vice President of HIT Han Jiecai and Guo Bin accompanied the visit. ■

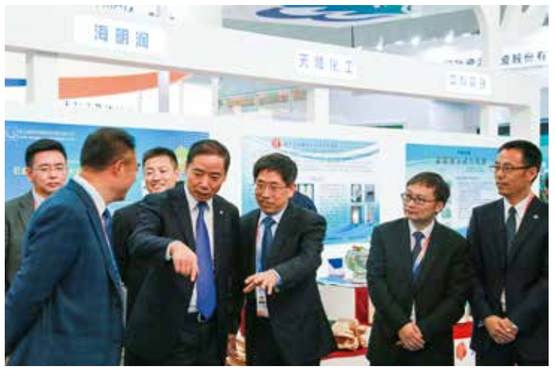
HIT INTELLIGENT ROBOTS EXHIBITED IN CHINA-RUSSIA EXPO

From October 12 to 16, "The 2nd China-Russia Expo and the 26th China Harbin International Economic and Trade Fair" was held in Harbin. Harbin Institute of Technology (HIT) exhibited intelligent robots and many other research achievements, which attracted participants both domestic and overseas.

According to the unified arrangements of the provincial government, HIT joined in the strategic new exhibition organized by Heilongjiang Province, including HIT Robotics Group, HIT Welding Industry Group, Institute of Laser Communication, Industrial Technology Research Institute of Heilongjiang Province and HIT Crown Co., Ltd. HIT presented its advanced and innovative research achievements and products of high-end equipment manufacturing, new materials, new generation information technology and green products.

HIT Robotics Group (HRG) presented several series of industrial robots and service robots, including Six-axis Joint Robot, welding robots and usher robots, which raised people's awareness of "intelligent production and intelligent life". Stylish and multi-functional robot "Will" became the super star in the exhibition. Numerous visitors stopped to watch and tried to interact with it. It is the intelligent service robot independently researched and developed by HRG, with multiple functions such as man-machine communication, facial recognition, auto-navigation, automatic obstacle-avoidance and security monitoring.





Because Robot Will is used in financial industry, various customized functions were exclusively designed, including advertisement display, intelligent system integration, business consultation, business recommendation etc. Moreover, HRG exhibited a series of unmanned aerial vehicles such as customs patrol drone and model training airplane.

The China-Russia Expo is a big national and international economic and trade exposition approved by the government of the People's Republic of China (PRC). It is co-sponsored by the Ministry of Commerce of PRC, the People's Government of Heilongjiang Province, the Ministry of Economic Development of the Russian Federation, and the Ministry of Industry and Trade of the Russian Federation. The China-Russia Expo was previously called the "China Harbin International Economic and Trade Fair". In October 2013, during the regular meeting of the Chinese and Russian Prime Ministers, the "China Harbin International Economic and Trade Fair" was renamed as the "China-Russia Exposition" by Li Keqiang and Medvedev. This year's Expo attracted 1,279 companies and institutes, 38.3% of them coming from 21 countries including South Korea, Japan, Thailand and Hong Kong, Macao and Taiwan areas, which is the highest level of internationalization in the history.

China's Vice Premier Wang Yang, Russia's Deputy Prime Minister Dmitry Rogozin and other officials visited the HIT exhibition area, accompanied by Party Secretary of HIT Wang Shuquan and Vice President of HIT Han Jiecai.■

BRICS UNIVERSITY PRESIDENT FORUM 2015

On October 17, BRICS University President Forum was held at Beijing Normal University. As the academic cooperation platform, BRICS is the think-tank providing suggestions and solutions to tackle international affairs concerning BRICS interests and deal with global economic and political changes.

During the Forum, the presidents had heated debates on innovation, transformation, university engagement, and collaboration among BRICS. At the roundtable, HIT Vice President Ren Nanqi emphasized "University is the source of personnel training, technological progress and civilization inheriting. We should exchange ideas with each other, learn from

each other, open to the world and show strength and characteristics, especially in the information age. HIT will play an active role in the establishment and development of BRICS University League and promote cooperation and communication." He also advised that regular communication dealing with science and humanity is significant, including the BRICS elite training scholarships, the youth entrepreneurship and innovation competitions and academic exchanges. After three rounds of roundtable meetings, the university presidents of over 50 renowned universities from Brazil, Russia, India, South Africa and China signed the "Beijing Consensus". According to the "Beijing Consensus", the BRICS members should strengthen trust and understanding across the world to promote communication between different civilizations. Moreover, it will vigorously promote environmental protection and high-level exchange programs, which will bridge the gap between young students and the world.

During the Forum, Ren Nanqi also had a meeting with Russian Ambassador to China Andrey Denisov and the President of Ural Federal University Koksharov respectively and gave them "Memorial Album of ASRTU in Anti-Fascist War" as gift.

RUSSELL GROUP HIGH-END MEETING

Founded in 1994, the Russell Group represents 24 leading UK universities which are committed to maintaining the very best research, an outstanding teaching and learning experience and unrivalled links with business and the public sector.

On November 3, Vice President Xu Dianguo of HIT attended in the Russell Group High-end Meeting in British Consulate-General Shanghai, debating the opportunities and challenges faced by top universities in Britain and China, and the advantages of collaborations.

Dr. Wendy Piatt (Chief Executive of the Russell Group), British Consulate in Shanghai, Nicolas Miles (Vice chancellor for Advancement of University of Nottingham), Chinese universities delegation and other British business representatives also attended the meeting. ■

WE LOOK FORWARD TO SEEING YOU IN XI'AN FOR THE ICCM-21

The International Conference on Composite Materials is an international conference held every two years, with the highest academic level, largest scale and greatest influence. Under the leadership of Prof. Du Shanyi from Harbin Institute of Technology (HIT), Chinese academic committee has successfully won the right to host the 21th International Conference on Composite Materials (ICCM-21), ICCM-21 will be held in Xi'an during August 20-25, 2017. Prof. Du Shanyi will serve as the General Chair, and Prof. Leng Jinsong from HIT will be honored to serve as the Executive Chair. The conference website is www.iccm21.org. It is going to be another international academic conference on composites held in China after the year 2001, which will definitely contribute to China's expanding global influence in the field of composite materials.

Prof. Du Shanyi is the President of Chinese Society for Composite Materials, who actively promotes academic communication and cooperation in the composite materials field both at home and abroad. As one of the academic leaders of Chinese composite materials, Prof. Du has great influence on the development and application of composite materials in aerospace, defense armament, oceanographic engineering and ships, infrastructure, and modern transportation.

At the ICCM-20, Prof. Leng Jinsong delivered a 60-minute Plenary Talk to more than 1800 attendees, which introduced the research advancements of smart composites at HIT in detail. Among the six invited Plenary Speakers, Prof. Leng was the only Asian scientist and his excellent Plenary Lecture received warm and enthusiastic response from scientists, industry experts, researchers and organizers at ICCM-20.

Xi'an, is the capital of Shaanxi Province, located in the northwest of China. As the oldest of the Four Great Ancient Capitals of China and the starting point of the Silk Road, it is famous for its rich culture and history. The Mausoleum of Emperor Qin Shihuang is one of the most famous historical spots in Xi'an with over 100 satellite burial pits and tombs, both large and small, which have so far been unearthed. The largest and most attractive is undoubtedly the one housing the Qin Terracotta Army, which is, about 8,000 life-size terracotta warriors and horses covering an area of over 20,000 square meters. There are numerous well known historic resorts such as Giant Wild Goose Pagoda, Bell Tower, Drum Tower, Ming dynasty city wall, The Great Mosque of Xi'an and so forth. With the ICCM-21 going to be held in 2017, the delegates will be visiting Xi'an as one of the most attractive and pleasant city.■

WE LOOK FORWARD TO SEEING YOU IN XI'AN FOR THE ICCM-21!

2015 ASRTU YOUTH MAKER CAMP HELD

From November 6 to 16, 2015 ASRTU Youth Maker Camp was successfully held.

This eleven-day camp was sponsored by ASRTU and organized by HIT and MISiS. More than 80 college students from China and Russia participated in the Youth Club Round-Table Conference, the Youth Innovative and Entrepreneurial Exchange, China-Russia Get-Together, the Chinese Traditional Cultural Experience Class and Harbin Cultural Tour.

These activities enhanced understanding, friendship, solidarity and cooperation between the youth of China and Russia, showed the innovative and vigorous spirit of China-Russia youth, and promoted the on-going China-Russia Youth Friendly Exchange Year.■

Visiting the Museum

Chinese Traditional Cultural Experience Class

2015 'WORLD HAND IN HAND' GALA HELD

News & Events

On the evening of November 28, 2015 "World Hand in Hand" Gala was jointly hosted by International Student Centre and Youth League Committee of Harbin Institute of Technology.

Twenty fascinating programs were performed by students from more than one hundred countries and regions, including symphony performances, dances, songs, folk music and so forth. It was the good opportunity to make the audiences feel the different traditions and culture and promote the friendship of Chinese and international students. This gala attracted about 200 students and faculties to participate in the performances and most of the programs were cooperated by Chinese and international students. What is different from before is that the teacher chorus from School of Civil Engineering performed on the stage for the very first time, which won the warm applauds from the audience.

From 2010, "World Hand in Hand" Gala is HIT branding event for improving the multicultural campus and international school atmosphere, which is so-called the "HIT International Spring Festival Gala". ■

INTERNATIONAL CULTURE CARNIVAL 2015 AND GROUP WEDDING OF DOCTORAL STUDENTS HELD

On June 6, people from 105 countries gathered in the pedestrian street for the inaugural International Culture Carnival of Harbin Institute of Technology (HIT). Students showed their culture in a variety of forms attracting the eyeballs of the audience.

With the theme of "One Belt One Road Prosperity Together, China and the world Hand in Hand", the culture carnival aims at providing a stage for international students to show their culture and for Chinese students to learn about the world, so as to promote international communication, enhance HIT's international impact on education and accelerate the internationalization of the campus.

Singing, dancing, cheering, chatting... The pedestrian street was crowded with people of all colours dressed in their local costumes. In the culture exhibition, different kinds of foods, costumes and handicrafts with their nations' special characteristics attracted passers-by to stop and watch. It was the big party for people from all over the world.

On the same day, "The 3rd Group Wedding of Doctoral Students- the Most Beautiful Commitment beside the School Motto Stone" was held. 53 couples' holy love was witnessed by university officials, supervisors, family relatives and friends. As the Chief Witness, Party Secretary of HIT Wang Shuquan awarded certificates and souvenirs for new couples.

Along with the graceful melody, 53 couples with sweet smile walked on the red carpet arm in arm. The groom holding bouquet proposed to the bride "I love you. Will you marry me and let me take care of you for the whole life?" "Yes, I do." The audiences were touched by their true love giving warm applause. After the proposal ceremony the couples raised their glasses to toast for love.

HARBIN INSTITUTE OF TECHNOLOGY NEWSLETTER 2015

HIT TIMES

CONTACT US:

Address: Editorial Department of Journal of Harbin Institute of Technology, 508 Shao Yifu Building, 92 West Dazhi Street , Nan Gang District, Harbin, Heilongjiang Province, China
Post Code: 150001
Email: hit-times@hit.edu.cn

HIT TIMES ONLINE:

The HIT TIMES can be read online at http://hit-times.hit.edu.cn
The views expressed in this publication are the views of the authors and do not necessarily reflect the views of the Harbin Institute of Technology.