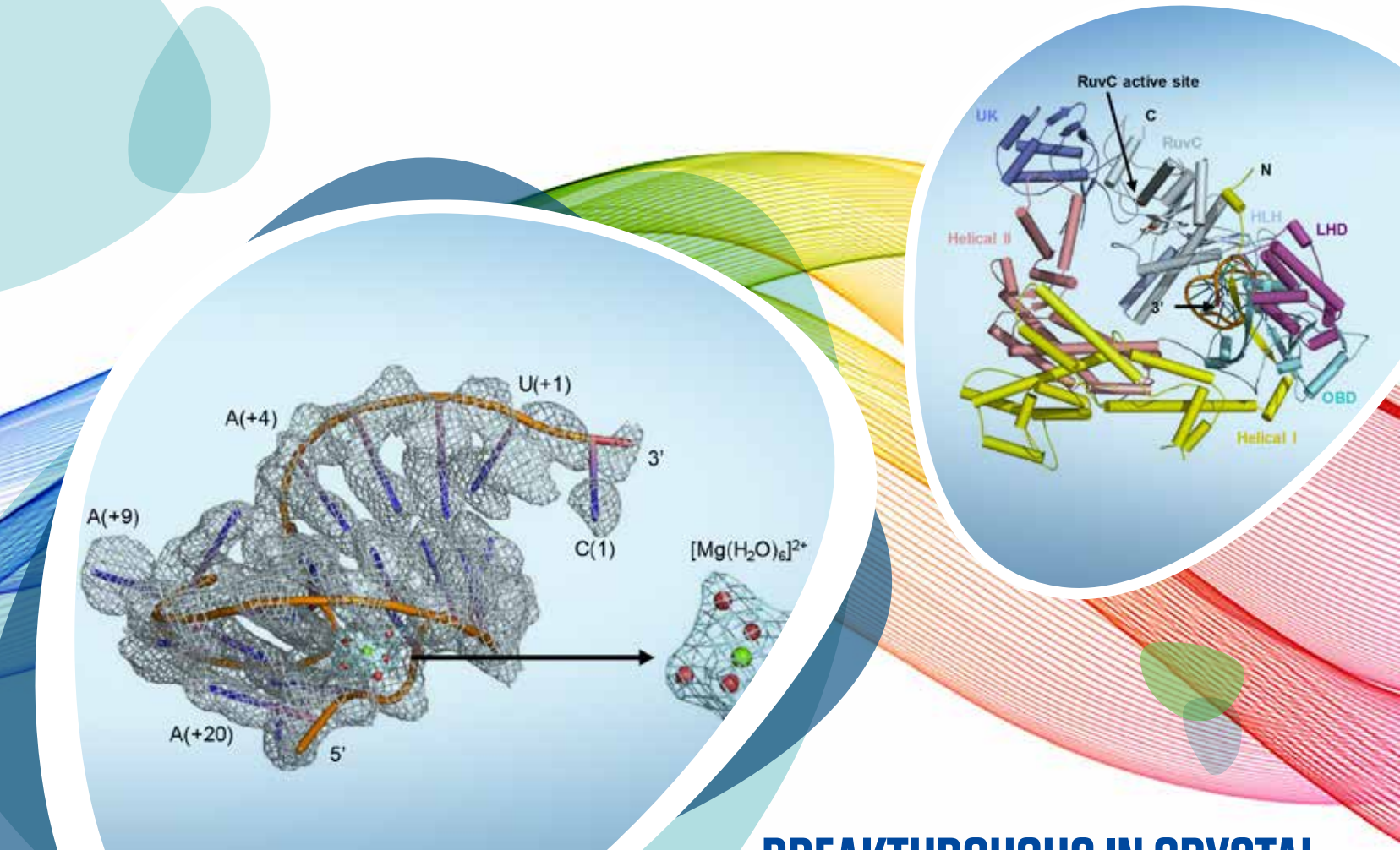
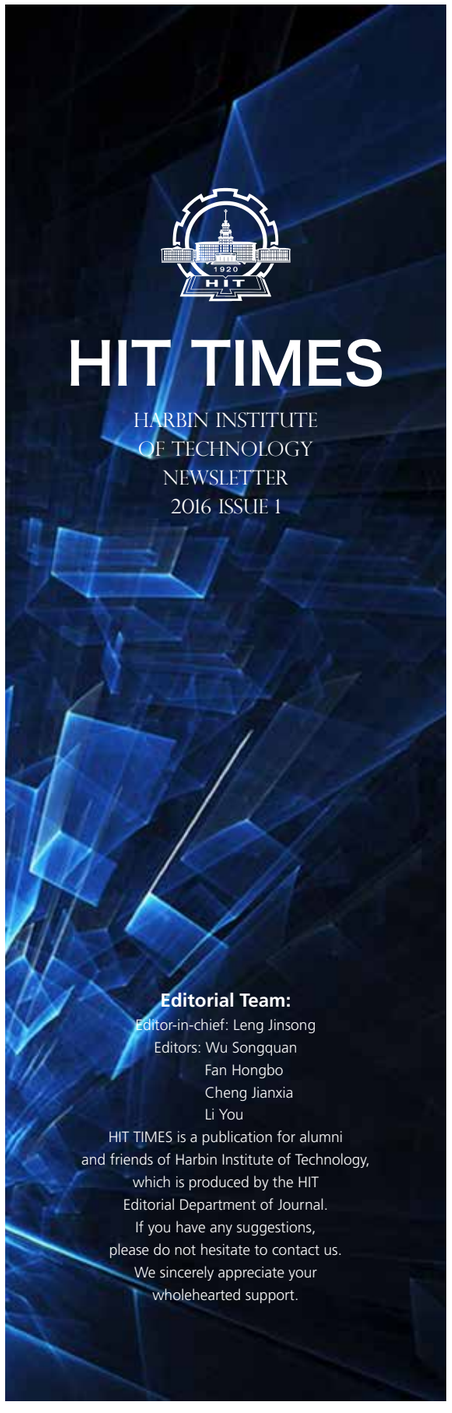
HARBIN INSTITUTE OF TECHNOLOGY
NEWSLETTER 2016 ISSUE 1

HIT TIMES



BREAKTHROUGHS IN CRYSTAL STRUCTURE OF CPF1 IN COMPLEX WITH CRISPR RNA

HIT WON 12 STATE SCIENCE AND TECHNOLOGY AWARDS



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AWARDS & HONORS

HIT WON 12 STATE SCIENCE AND TECHNOLOGY AWARDS

The annual "State Science and Technology Awards Ceremony" was held in Beijing on January 8, 2016. 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 where China's most prestigious awards for scientific and technological achievements in 2015 were presented to 295 research projects.

Harbin Institute of Technology won 12 of these awards including 1 State Science and Technology Progress Award, 2 State Natural Science Awards, 3 State Technological Invention Awards, and 6 collaborative projects won prizes.

The project led by Prof. Liu Yongtan from School of Electronics and Information Engineering won the 1st prize of State Science and Technology Progress Awards.

"Mechanism of Active Deformation and Mechanical Behaviour of Shape Memory and Electroactive Polymer-Based Composite Materials and Structures" led by Prof. Leng Jinsong from School of Astronautics, and the project on "Theory and Applications of Parametric Designs for Constrained Control Systems" led by Prof. Duan Guangren from School of Astronautics, both won the 2nd prizes in the State Natural Science Awards.

Three projects won the 2nd prizes in the State Technological Invention Awards: the project led by Prof. Liu Hong from School of Mechatronics Engineering, "Key Technologies of High-Temperature Resistant Hybrid Silicone Resin and Its Composites Preparation" led by Prof. Huang Yudong from School of Chemistry and Chemical Engineering, and the project on "High-Performance Central-Fuel-Rich Swirling Combustion Technology" led by Prof. Li Zhengqi from School of Energy Science and Engineering. ■

PROF. LIU YONGTAN WON THE 1ST PRIZE OF STATE SCIENCE AND TECHNOLOGY PROGRESS AWARDS

Found in the 1980s, the New System Radar Innovative Research Team of Harbin Institute of Technology, led by Prof. Liu Yongtan (an academician of Chinese Academy of Science and Chinese Academy of Engineering), has pioneered the research of New System Radar in China.

Compared to the conventional microwave radar, it is more challenging to develop a New System Radar because of the complexity of the system, the instability of the electromagnetic environment, the dense interference and the large amount of information produced. It is impossible to solve these problems using conventional technologies, which are critical to radar performance. Therefore, creative methods and innovative approaches are required to break through the bottleneck for better performance. The team members worked hand in hand and shoulder to shoulder to tackle these challenges, even lacking of technical data and references. In the end, the researchers made major technological breakthroughs and accomplished the development of the New System Radar. The successful development of this New System Radar achieves the theoretical, technological and institutional innovations with the full intellectual property. This innovation not only fills the gap of the related research area in China, but also reaches an advanced level in the world. Due to this achievement, Prof. Liu Yongtan won the 1st Prize of State Science and Technology Progress Awards in 2016.

There are over 100 PhD students and 300 postgraduates graduated from the team. More than 500 papers, 5 monographs, 5 textbooks, and 1 translation have been published, in which 100 papers are indexed by SCI and 300 by EI. ■

PROF. LENG JINSONG WON THE 2ND PRIZE OF STATE NATURAL SCIENCE AWARDS

The smart materials and structures group of HIT, directed by Prof. Leng Jinsong and Prof. Liu Yanju, and advised by Prof. Du Shanyi (Member of Chinese Academy of Engineering), won the 2nd Prize of State Natural Science Awards for their contributions to the research of smart composites and structures.

The smart polymer composites and structures is an international frontier research topic which will have profound influences on many fields. The related mechanical research is novel and challenging. Financially supported by national research program and national defense program such as National Natural Science Fund and National High-tech R&D Program (863 Program), this research group has been engaged in comprehensive research of smart materials and structures for more than 20 years. Their research achievements provided theoretical foundations to the characterization, evaluation, structural design, as well as applications of smart polymer composites, and had wide application potential in advanced manufacture, biomedicine, flexible electronics and soft robotics in the future.

Shape memory polymers (SMPs) are typical soft smart materials that can change their shapes when triggered by external stimuli including heat, electricity, magnetism, light and solution. They proposed a method that could simultaneously enhance the mechanical performances and electrically driving properties of SMPs and realized the electroactive actuation of thermosetting SMP composites. Mechanical behaviors of shape memory polymer composites subjected to different stimulus were characterized. The micro buckling mechanism of large flexure deformation in shape memory composite structures was illustrated, and the evolution laws of shape memory performance and thermo-mechanical behavior rules of shape memory composites under cyclic bending and different temperatures were revealed.

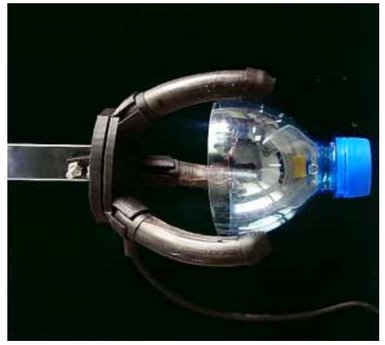
Vascular stent

Adaptive fracture external fixator

The biomedical applications of shape memory polymers

Dielectric elastomers are also the representative soft smart materials that could deform sustainably when subjected to an external voltage. The constitutive model, electromechanical stability, snap-through stability and failure of dielectric elastomers have been analyzed, considering the nonlinear behaviors of dielectric elastomers, such as hyperelasticity, stress hardening, particles filling, nonlinear dielectric performance, and polarization saturation. Based on dielectric elastomers, various actuators have been designed and fabricated, including stacked, folded, spring roll actuator and inflated hemispherical actuators. The applications of dielectric elastomers and their actuators are also investigated, such as artificial arm, facial expression, Braille tactile display, energy harvester, flexible gripper, soft crawling robots, and so on.

Apart from the contributions related to the State Natural Science Awards, smart materials and structures group has also made effort in the development of multifunctional nanocomposites and devices, 4D printing, applications of smart mandrels, structural health monitoring, active vibration control, and so on. The outstanding achievements have earned the group members international recognition. Prof. Leng Jinsong has been elected as Fellow of SPIE, Fellow of IOP, Fellow of IMMM, Fellow of RAeS and Associate Fellow of AIAA, and also served as the Executive Council Member of the International Committee on Composite Materials (ICCM) and the Editor in Chief of International Journal of Smart and Nano Materials. Prof. Liu Yanju has served as the Associate Editor of Smart Materials and Structures. The group members have also been invited to deliver more than 20 Plenary/Keynote talks at international conferences such as ICCM, SPIE Smart Structures/NDE, ASME IMECE, ECCM, ACCM, PFAM, etc. ■

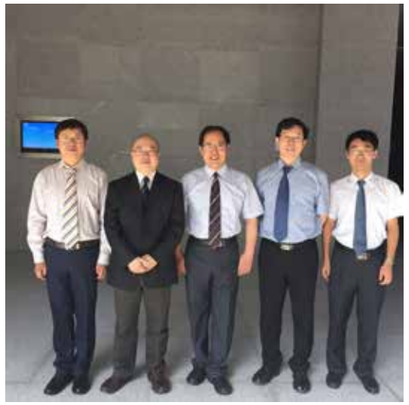


Flexible gripper

Inchworm-inspired soft crawling robot

Applications of dielectric elastomers in soft robotics

PROF. DUAN GUANGREN WON THE 2ND PRIZE OF STATE NATURAL SCIENCE AWARDS



Prof. Duan Guangren won the 2nd Prize of State Natural Science Awards for a dynamic system composed of actuators, sensors and physical plants. Due to the physical limitation of an actuator, it can only work with bounded input signals. In this sense, an arbitrary practical plant is really an input-constrained system. In addition, there may exist geometrical or interconnected constraints in some practical physical plants. For this kind of systems, it is necessary to describe them by dynamical systems where there are some constraints in the state variables. Such kinds of systems are state constrained systems. In some other cases, the sensors may be very far from the physical plants, and thus it is inevitable that the considered plant is subjected to communication constraints. For these constrained systems, design approaches for conventional control systems are not applicable in the presence of constraints. If these constraints are neglected during the stage of control systems design, the performance of the closed-loop systems may be degraded, and even to the point the system is unstable. Due to these reasons, it is theoretically and practically important to investigate control theory and approaches for different kinds of constrained systems.

Since 2007, the project has been financially supported by National Natural Science Foundation of China (Science Fund for Creative Research Groups, the State Key Program, National Science Foundation for Distinguished Young Scholars and several general projects), 973 Program, Foundation for the Author of National Excellent Doctoral Dissertation of China, Program for New Century Excellent Talents in University from Ministry of Education of China, and the General Research Fund of Hong Kong Research Grants Council.

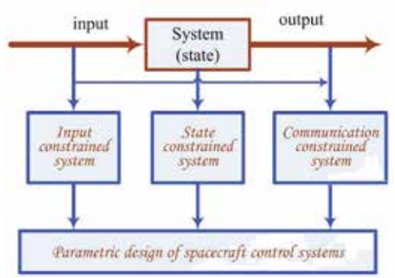
In this project, three classes of constrained systems, namely, input-constrained systems, state constrained systems, and communication-constrained systems, are deeply investigated. A framework of parametric design for constrained systems is systematically established by improving our previous parametric design approaches for conventional control systems. In this project, we solve a batch of key problems for constrained systems, and obtain a series of important theoretical results, which have been applied to parametric design for guidance and control of spacecraft. The contents of this project are arranged into 2 parts, theory and application. The part of theory includes parametric design for state constrained systems, input-constrained systems, and communication-constrained systems. In the part of application, parametric design is given for guidance and control of aerospace craft. The obtained achievement forms a systematically theoretical framework for parametric design of constrained systems.

Primary discoveries of this project can be summarized as follows:

- By introducing the concepts of I-controllablizability and impulsive-mode controllablizability, parametric design approaches are systematically established for impulsive mode elimination and observer design of systems with constrained states based on a kind of complicated Sylvester matrix equations.
- Parametric design theories and approaches are built for global, semi-global and local stabilizing control laws for input constrained systems based on parametric Lyapunov equations and a new convex hull treatment of saturation nonlinearity.
- By adopting the idea of predictive control and using the feedback gains for control systems without a network as the design parameters, parametric design approaches are established for control systems with communication constrains such as packet dropouts and time delays.
- Parametric design approaches for control of soft lunar landing, elliptical orbital spacecraft rendezvous and high-speed fast-maneuvering missiles are proposed based on the established parametric approaches for constrained control systems.

The 20 primary papers of this project have received 1007 SCI citations by others (the highest times of single paper citation by others is 151) and 2187 Google Scholar citations by others (the highest times of single paper citation by others is 456). 7 papers are ranked among Top 1% Highly Cited Papers, and 3 papers are ranked among Top 0.1% Highly Cited Papers, according to the ESI reports. The 8 representative papers have received 423 SCI citations and 1040 Google Scholar citations. The obtained results are cited by 58 papers published on IEEE TAC and Automatica, by 115 papers published on IEEE Transactions, and by some distinguished scholars including K. Åström, G. Goodwin and some other more than 30 IEEE Fellows and 10 IFAC Fellows. Some of the results are claimed to be “first introduced”, “novel” or “new”, and some are said to be “elegant”, “beautiful” or “effective”. Also, the project results have gained very positive evaluation and comments from Sun Jiadong, winner of the Golden Medal of "The Earliest Two Missiles and One Satellite" from the Chinese Government, winner of the Highest Award of Science and Technology of China, and member of the Chinese Academy of Science.

For our significant contribution to the constrained control systems, our two young investigators Zhou Bin and Wu Aiguo won the “National Excellent Doctoral Dissertation Award”, the investigators Duan Guangren and Zhou Bin won respectively the “Excellent Scholars in China” and the “5th China Youth Science and Technology Innovation Awards”; and the investigators James Lam and Liu Guoping won the “Highly Cited Researcher Award” granted by Thomson Reuter and were respectively selected as IEEE Fellows in 2011 and 2012. Moreover, some of the investigators have served and are serving as editors-in-chief and associate editors for many international journals. ■



PROF. LIU HONG WON THE 2ND PRIZE OF STATE TECHNOLOGICAL INVENTION AWARDS

A space manipulator system built by the School of Mechatronics Engineering (HIT) was launched in 2013. Some space experiments such as remote control/teleoperation, ORU assembly, in-orbit satellite's releasing, inspection and maintenance, etc., have been tested successfully. It is China's first space robot system in orbit.

The system consists of a 6 degree of freedom (DOF) arm, 1 gripper with a hand camera and a central controller. In the harsh space environment, the space manipulator can help or even substitute for human beings accomplishing a large variety of sophisticated operations. In-orbit servicing will have great potential for satellite maintenance, large space structure building and even for space debris clearing. From fundamental theory study to key technology investigation and then to engineering practice, the robot research team generally masters the methods and techniques used in design, fabrication, assembly, integration, ground test and space experiment of the robotic manipulator.

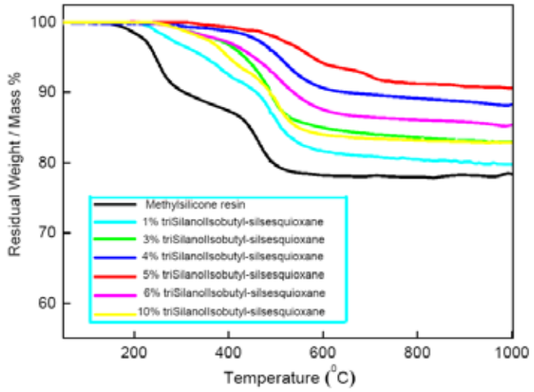
The research team is led by Prof. Liu Hong who is a distinguished expert enrolled in the "Thousand Talents Program" of China (also known as "Recruitment Program of Global Experts"). He has joined DLR (German Aerospace Center) since 1991. Currently he is also the director of the State Key Laboratory of Robotics and System, HIT. This successful experiment was awarded as one of the Ten Major Scientific and Technological Progress in China's Colleges and Universities (2013). It was also awarded the second prize of State Technological Invention Awards in 2016. ■

PROF. HUANG YUDONG WON THE 2ND PRIZE OF STATE TECHNOLOGICAL INVENTION AWARDS

As an extremely important, indispensable basic raw material, silicone resin is playing a significant role in the fields of aviation, aerospace, communications, electronics and other high-tech areas. Because of the high energy of Si-O bonds, silicone resin is becoming a new generation of high temperature resistant coating material between polymer and ceramic. However, organic silicone resin can rapidly degrade above 400°C, causing the decrease of composite structure strength, which limits the service temperature of silicone resin, which has become a recognized international difficult problem.

A research team led by Prof. Huang Yudong, from School of Chemistry and Chemical Engineering, Harbin Institute of Technology, spent more than 15 years doing research on the program of "Key Technologies of High-Temperature Resistant Hybrid Silicone Resin and Its Composites Preparation" that resulted in great achievements. The team includes the members Liu Li, Jiang Bo, Chen Xiangqun, Hu Lijiang and Bai Yongping, This research started from three aspects: silicone resin degradation kinetics, high temperature transformation rule of silicone resin bonding structure, and the mechanism of composites interface reaction and control. To meet the urgent demand for high temperature resistant silicone resin, the research group discovered the new phenomenon that the homologous large size effect of Si-OH contained polymorphous oligomeric silsesquioxane could thoroughly change the two-stage degradation mechanism of silicone resin, therefore the silicone heat resistance can be consequently enhanced. The team invented a new method to synthesize hybrid silicone resin which greatly improved the heat stability of the silicone resin. The research team created a new fabrication method of silicone resin composite material with structure-function integration and gradient transition heat resistance, which tackled the problem of using silicone resin as high temperature resistance structure composite material and achieved the engineering application.

High temperature coating for heat flux transducer



Thermal stability of hybrid silicone resin sustains over 400°C demonstrated in TG curves

The research results resulted in 32 national invention patents and 176 papers published in international renowned journals. The research team ranks first in the world, with the largest number of papers publishing in the silicone resin composite area, according to the ISI statistics. All of these original works in heat resistant hybrid silicone are leading the international tracking study. This project's overall technology has achieved the transformation of technical achievements and has obtained remarkable economic and social benefits. The key technology successfully applied to a series of developed products of Chinese manned space flight, the satellite, the national major projects and electronic fields. The research achievements of silicone resin have made a great contribution to the improvement of both the independent innovation ability and the technical level in China and significantly promotes technological progress of high temperature resistant resin materials and related industries in our country.

In 2016, the project won the second prize of State Technological Invention Awards. ■

PROF. LI ZHENGQI WON THE 2ND PRIZE OF STATE TECHNOLOGICAL INVENTION AWARDS

The high-performance central-fuel-rich swirling pulverized-coal combustion technology, invented by Prof. Li Zhengqi's team from the School of Energy Science and Engineering HIT, won the 2nd Prize of State Technological Invention Awards.

Supported by the National High-Tech Research and Development Program (863 Program) and National Key Technology Support Program of China and combined with the industry-university-research cooperation, Prof. Li Zhengqi's team deeply studied the swirling pulverized-coal combustion principle, put forward the combustion organization method of sending the high-concentration pulverized coal into the central recirculation zone, invented the central-fuel-rich swirling pulverized-coal combustion technology and equipment, and overcame a series of technical problems in the pulverized-coal combustion technology including low NOx emissions, high pulverized-coal combustion efficiency, stable combustion, and preventing slagging and high temperature corrosion.

The main innovation points of this invention included:

(1) the combustion organization method of directly sending the highly concentrated pulverized coal into the middle of the central high-temperature recirculation zone, and the direct-flow primary-air and swirling pulverized-coal burner structure without a central expansion cone, this invention point changed the outer-rich inner-lean distribution pattern of primary coal/air mixture in the traditional swirling burner.

(2) An optimal design method of swirling inner and outer secondary air was proposed and the burner structure with the stepped secondary air flaring was invented.

(3) The central-fuel-rich combustion technology and equipment were invented, which improved the coal adaptability and sharply decreased the NOx emissions by 42~65%.

Currently, Prof. Li's team owns the authorizations of one United States invention patent and 12 China invention patents, finished the relevant key equipment development and system design, and published an English work. In addition, 56 academic papers (SCI included 40 articles, EI included 47 articles) have been published and the total SCI other citations are 138. In nearly six years, the number of papers included in SCI as the first inventor in the coal combustion field ranked first in the international arena. One of his Ph.D students won the National 100 Outstanding Doctoral Thesis Nomination Award. An expert opinion stated that: "this invention has important theoretical innovations, has achieved a technological breakthrough, reached the internationally advanced level, and reached the international leading level of burning the anthracite and lean coal".

Compared with the similar technology in China and abroad, this invention reduced the NOx emissions of 42 ~65% and simultaneously kept the boiler efficiency essentially unchanged or slightly increased, the problems of slagging and high temperature corrosion which influenced the safe operation of the boiler have been fundamentally improved. The invented technology has been fully applied to 32 600MW, 500MW and 300MW grade units (the total installed capacity is 16200MW) manufactured by China's boiler plants which introduced the technologies from the United States, Britain, Japan and other countries, or manufactured by Japan and other countries, of which 21 boilers are the 600MW units (12 boilers are supercritical units), which meets significant needs of production, with significant social and economic benefits. The Shanghai boiler plant is also promoting the application of this invention.

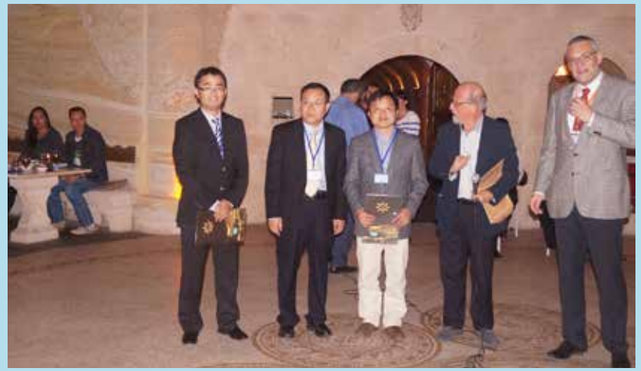
PROF. MA JUN RECEIVED SUSTAINABLE WATER AWARD 2016

Whilst there is an abundance of water on Earth, the majority is locked away from human use; only 3% is fresh water; and slightly over two-thirds of this is frozen in glaciers and polar ice caps. Although fresh water is a renewable resource the world's supply is steadily decreasing and there is a need for sustainable management in all areas of the water cycle.

Adapted or novel chemical science and technology solutions will play a major role in shaping future water sustainability. The Sustainable Water Award is for the contributions of chemical sciences to equitable water supply.

Prof. Ma Jun was awarded the Sustainable Water Award 2016 Winner

by the Royal Society of Chemistry for his contribution to the development and application of novel technologies for wastewater treatment processes. In the field of water and wastewater treatment, he has been doing research on the processes of oxidation, nanoparticles and membranes. He is the recipient of two State Technological Invention Awards from the Chinese Government, China Young Scientist Award, and the Achievement Award of Changjiang Scholars (Engineering Science Award). He has been authorized over 90 invention patents and has published over 200 peer reviewed international journal papers. He has been awarded the Excellence in Review Award of the Journal of Environmental Science and Technology. He is the Advisory Board Editorial Member of Environmental Science and Technology Letter and Environmental Science: Water Research and Technology. ■



Prof. Zhao Junming (middle) receives the Elsevier/Journal of Quantitative Spectroscopy & Radiative Transfer Raymond Viskanta Award at the 8th International Symposium on Radiative Transfer (RAD'16) in Cappadocia, Turkey.

PROF. ZHAO JUNMING WON 2016 JQSRT/ELSEVIER VISKANTA YOUNG SCIENTIST AWARDS

On 9 June 2016, Professor Zhao Junming from School of Energy Science and Engineering at Harbin Institute of Technology (HIT) won the 2016 JQSRT/ Elsevier Viskanta Young Scientist Award at the 8th International Symposium on Radiative Transfer (RAD16) held in Cappadocia, Turkey. The Viskanta Award is awarded to early-career scientists and engineers who work on the theory and application of radiative transfer (including thermal sciences, atmospheric radiation, optical sciences, near- and far-field radiation transfer, remote sensing or all other relevant areas). This is the first time that a researcher from China has won the award in the decade since the award was established in 2007.

The Elsevier young-scientist award in the category of Radiative Transfer is named after Professor Raymond Viskanta of Purdue University, Indiana, USA to honor his profound contributions to the field of Radiative Transfer. Professor Raymond Viskanta is a member of the US National Academy of Engineering. He has influenced many engineers and researchers during his stellar career. The winner of the Raymond Viskanta Award is elected by a committee chaired by the Editor-in-Chief of Journal of Quantitative Spectroscopy & Radiative Transfer (JQSRT) and consisting of several key people in the field of radiative transfer. The three Editors-in-Chief of JQSRT have been working closely with the Elsevier Publisher to identify the best young researchers who have contributed to their respective fields. Candidate names are solicited and discussed amongst the members, after which a winner is elected.

The awards are in principle awarded every year, and traditionally presented during a conference related to one of the three focus areas of the journal. The award consists of a framed certificate and a monetary prize of 500 Euro.

Zhao's research focused on thermal radiation transfer in complex media, including radiative transfer models and numerical methods for solving complex radiative transfer problems in heat transfer and non-invasive measurement, micro/nano radiative heat transfer, radiative properties tuning, near field radiative heat transfer particularly with applications in solar energy harvesting and thermal management.

His main contributions in the field of thermal radiation transfer included the derivation of general form equation of radiative transfer in media of gradient refractive index, the theoretical development of second order radiative transfer equation which overcomes the numerical stability problem of the classical radiative transfer equation, and the development of higher order accuracy methods to solve radiative transfer problems. He gave a talk on near field radiation heat transfer between two nanoparticle clusters at RAD16.

He has published more than 60 papers in his field of research and coauthored two books. Prior to receiving the Raymond Viskanta Young Scientist Award, he was a winner of the 2009 Excellent Ph.D. dissertation of HIT and nominated for the 2009 Excellent Ph.D. dissertation of China. He was elected to enter the Excellent Young Scholar in Fundamental Research Incubation Program of HIT in 2014 and the Youth Top-Notch Talent Support Program of HIT in 2015. He is a member of the Scientific Council International Centre of Heat and Mass Transfer and several other academic organizations. ■

Certificate of the Elsevier/ Journal of Quantitative Spectroscopy & Radiative Transfer Raymond Viskanta Award presented to Zhao Junming.

PROF. ZHANG DONGLAI'S TEAM WON THE ANDY CHI BEST PAPER AWARD OF IEEE

By publishing a paper titled "A Magnetostrictive Guided-Wave Nondestructive Testing Method with Multifrequency Excitation Pulse Signal" in Institute of Electrical and Electronics Engineers (IEEE) Transactions on Instrumentation and Measurement in December, 2014, Professor Zhang Donglai and his team including doctoral students Zhou Zhihui, Zhang Enchao, Yang Yang, Zhao Min and postgraduate student Sun Jinping from Power Electronics and Electrical Drives Lab, School of Mechanic Engineering Automation, Harbin Institute of Technology Shenzhen Graduate School (HITSZ), won 2015 Andy Chi Best Paper Award of the IEEE Instrumentation and Measurement Society. On 25 May 2016, Mr. Zhang Enchao, on behalf of the team, accepted the award at 2016 IEEE International Instrumentation and Measurement Technology Conference (I2MTC) in Taipei, Taiwan.

The IEEE Instrumentation and Measurement Society is dedicated to developing and applying the electrical and electronic instruments and equipment to measure, monitor and/or record physical phenomena. IEEE Transactions on Instrumentation and Measurement has considerable influence in the field of international instruments and measurement technology. The Andy Chi Best Paper Award is given annually to the author, or authors, of the one outstanding paper published in the Transactions of the Instrumentation and Measurement Society during the previous year.

As a rapid, non-contact, and non-destructive method, magnetostrictive guided wave has been used widely in the long range health inspection of pipe and stay-cables. Traditionally, excitation signal with high amplitude and long pulse duration is used to increase excitation energy and detection distance of the magnetostrictive guided wave. However, the longer the pulse duration of single frequency signal, the lower the adjacent defect resolution and accuracy of defect location. As a result of this problem, a new system and method have been designed in this research. Firstly, excitation frequency range is chosen from the dispersion curve calculated by the physical parameters of material. Then an encoded multi-frequency signal is used to excite the guided wave. After signal conditioning, the echo signal of defects is averaged, then filtered by a matched filter, so the pulse width of echo is compressed greatly. Experiments of two kinds of situations with no defect and many defects have been tested. The results prove that the method, using the multi-frequency excitation signal, has the ability to improve the adjacent defect resolution and accuracy of defect location in the propagation direction of a magnetostrictive guided wave.

Prof. Zhang Donglai is the director of Power Electronic and Motion Control Research Centre, School of Mechanical Engineering and Automation, Harbin Institute of Technology Shenzhen Graduate School, who is academically fruitful. It is worthy to mention that Prof. Zhang Donglai and his team published a paper titled "More Accurate Localized Wire Rope Testing Based on Hall Sensor Array" in Materials Evaluation in September, 2006. The paper won the ASNT 2007 Outstanding Paper Award. ■

HIT TEAM WON IN THE CHINA-BELARUS YOUTH ROBOT COMPETITION

From May 25 to 28, The China-Belarus Youth Robot Competition was held in Minsk and Brest in Belarus. HIT team won the contest of "Interstellar Adventure". China's ambassador to Belarus Cui Qiming and officials from Belarus's Ministry of Education as well as State Committee for Science and Technology attended and addressed at the opening ceremony.

As for China's teams, there were 26 students from Harbin Institute of Technology (HIT), Northeastern University, Shenyang Aerospace University, Shenyang Industrial University and other higher education institutions. They competed with 12 teams from Belarusian State Technological University and Brest State Technical University and other universities in two contests – "Formula 1 Robot Car Race" and "Interstellar Adventure". HIT team of 4 juniors won the first place in the contest of "Interstellar Adventure".

The competition was co-hosted by the Chinese Embassy in Belarus, State Committee for Science and Technology of the Republic of Belarus and Ministry of Education, and co-organized by the Confucius Institute at Belarusian State Technological University and Brest State Technical University. This was the first time that China and Belarus held a robotics competition together for students from both countries. ■

HIT WON THE 1ST PRIZE IN INTERNATIONAL CONSTRUCTION FESTIVAL 2016

On 10 June 2016, the International Construction Festival and "EHXIBITION" Architectural Design and Construction Competition was held in Tongji University. Among 58 groups, "Reflection • Dancing • Lotus" designed by a delegation from School of Architecture at Harbin Institute of Technology (HIT) won the First Prize. Delegations from Tongji University and the Bauhaus-Universität Weimar won the First Prize as well.

Water creates reflection, and reflection dances in the water. The work used the properties of the materials. On the premise of meeting the function and usage requirements, it is rich in the ornamental value with a complete form. The idea originated from the further change of the white lotus. The switching design was just like the blossom of the flower. The design of the inner space catered to the rainy weather of the Songhu area. Water lanterns made the space full of flowing

shadows, looking as if the lotus is born in the water and in perfect harmony with water.

International Construction Festival held by Tongji University is the most prestigious national architectural practice competition for college students. There were 14 national universities and 7 foreign universities attending the competition, altogether more than 500 students and teachers involved. By understanding the features of the base and properties of materials, each group gave free rein to their imagination and constructed the hollow-slabs architecture with workable inner space by using 40 sheets of hollow slabs and bolts within budgeted hours. ■

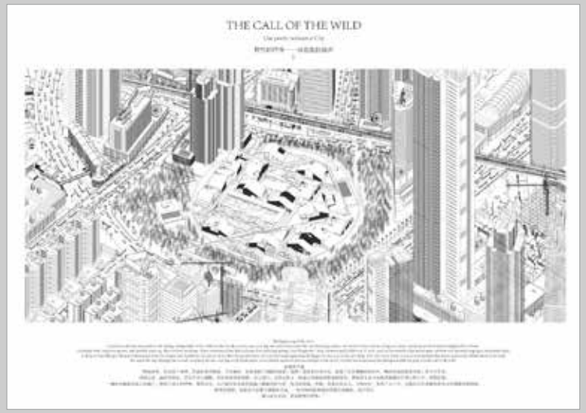
HIT WON THE 1ST PRIZE IN THE CONCEPTUAL COMMERCIAL PLAZA INTERNATIONAL ARCHITECTURAL DESIGN COMPETITION

AWARDS & HONORS
HIT TIMES 2016

In April of 2016, the inaugural "International Architectural Design Competition of Conceptual Commercial Plaza" was held. Undergraduates of School of Architecture at Harbin Institute of Technology (HIT) won the 1st Prize and two Excellence Awards in the competition for student groups. "The Call of the Wild" designed by Luo Zhaoyang from HIT and Wei Tangchen from Southeast University in collaboration, under the direction of HIT Prof. Sun Chen, won the sole First Prize.

The competition focused on figuring out the new way that commerce changes the cities and exploring the next development mode of commercial plazas. International master Daniel Libeskind and Inaki Abalosdean (the Dean from the Architectural Design Postgraduates School in Harvard University) served as judges for professional groups and student groups respectively. There were 158 groups from more than 40 domestic and foreign universities attending the student-group competition, such as Harvard University, Tsinghua University, etc.

The concept of proposal derived from the shape of minority villages in Guizhou, absorbing the construction characteristic to reform, for the purpose that ultimately build an village-stylized commercial plaza which is full of amusement, furthermore hiding the functional parts underground, and the open framework served as a residents' activity space, under the nine kinds of Stilt Houses-stylized variants. The proposal received praise from all judges for its innovative space form, the continuation of traditional context, the original form layout and the humanistic and ecological concerns. ■



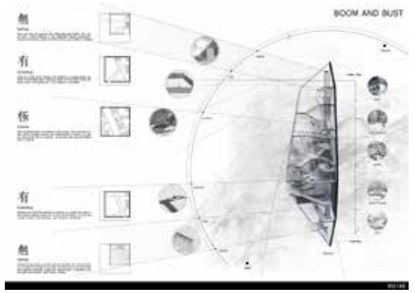
HIT WON THE 1ST AND 2ND PRIZES IN ICCC INTERNATIONAL COLLEGE STUDENTS DESIGN COMPETITION

There were more than 300 works submitted by students from 38 countries and regions such as the UK, the US and France, etc. 5 prizes for student-group competition and 5 prizes for individual competition were awarded. By the ingenious adoption of a vertical community, the first-prize work from HIT resolved problems of scarce land resources in densely populated cities and explored architectural way to work out aging society problems. Targeted at 100-year historical blocks in the city center, the second-prize work from HIT created a sharing society by means of space replacement. ■

Designed by undergraduates from School of Architecture at Harbin Institute of Technology (HIT) including Zhou Keting, Xu Rui, Bai Xueshan and Dong Danni, under the direction of Lecturer Lian Fei, the “Elderly Vertical Community” won the First Prize in 2016 ICCC International College Students Design Competition for student groups. Another design work “Common Space as a Catalyst for the Integration of Older People”, by Ju Xi, Wang Kaitai, Yan Di, Chen Mengfan, under the direction of Prof. Zhang Shanshan and Lecturer Xue Minghui won the Second Prize in the competition for student groups. On March 1, the award-winning students were invited to attend a high-grade working conference “The Future of Cities” in the UN headquarters, New York.

This competition was jointly held by UN-HABITAT, ICCC, DESA and other organizations, representing one of the most high-level international architectural design competitions. It was aimed at adequately demonstrating students’ capabilities in design and innovation of human development mode, in order to help elderly people fully integrate into the society and take part in social and cultural life.

HIT WON THE SOLE FIRST PRIZE IN THE 5TH SPANISH INNATURE INTERNATIONAL COMPETITION 2016



Designed by undergraduates from School of Architecture at Harbin Institute of Technology, including Zhong Shiling, Sun Jiaqi, Bai Jin, Zhang Juntong and He Xuan, under the direction of Associate Prof. Dong Yu, "Boom and Bust" was crowned the sole First Prize in the 5th INNATURE Competition 2016. It is the first time that Chinese students won this prize in the competition.

INNATURE competition is organized by OPENGAP in Spain every year, facing college students in Architecture and construction related persons all over the world, which enjoys a high reputation in Europe. This competition encourages contestants to seek harmonious relations between people and nature, to comply with natural laws and to find out new solutions in the protected natural environment.

The designers used Chinese characters “ 無 ” and “ 極 ” to imply the boom-and-bust circulation of the relationship between man and nature, and presented the cycle trait through exhibition and traffic space. There were five parts in total, being one to one correspondence with Chinese characters “ 無 ”, “ 有 ”, “ 極 ”, “ 有 ” and “ 無 ”, bonded together via vertical flow lines. The circular relation suggested the admiration and desire of people contacting with nature, as well as the madness and urgency of them, when remaking nature. The project provided a creative train of thought towards the relationship of man and nature, managing to guide people to understand how to get along with nature properly, which touched the judges deeply and made it stand out from the rest. ■

HIT DELEGATION WON CHAMPIONSHIP IN CHINA EXPLORATION NORTHEAST REGIONAL CONTEST

From June 14th to 16th, the 2nd "China Exploration - Sports & Culture Tour for Overseas Students in China Northeast Regional Contest" was held at Tianjin University. After 3-day fierce competition including Sports Art Exhibition, 3x3 Basketball Contest and Orienteering, with the highest total score, HIT delegation was qualified to participate in the finals. The HIT delegation was interviewed by People's Daily, China Central Television and other media.

In the contest, there were 18 teams with more than 150 Chinese and international students from 7 provinces and autonomous regions including Beijing, Tianjin, Hebei, Inner Mongolia, Heilongjiang, Jilin and Liaoning.

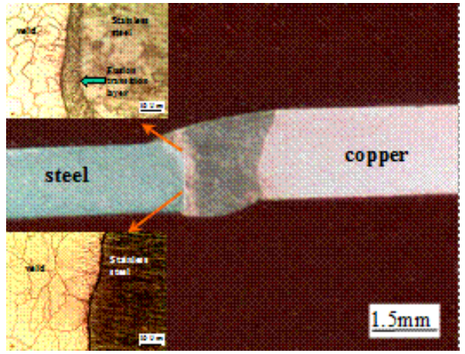
The competition was sponsored by the Ministry of Education, and was initiated as a brand of cultural activities for the 300,000 foreign students in China. Through sports events and recreational activities, international students showed their positive and energetic image. It was a good opportunity to promote the comprehensive understanding of China and the communication between Chinese and international teams. ■

RESEARCH
&
ACADEMIA

3 KEY TECHNOLOGIES OF CZ-7

On 25 June 2016, the maiden launch of the Long March 7 rocket (CZ-7) was successful in new Wenchang Space Launch Centre, located at the Hainan Island. After 20 hours' in-orbit flight, the Multi-purpose Subscale Spacecraft Reentry Capsule was successfully recovered in Inner Mongolia on June the 26th. 3 key technologies from Harbin Institute of Technology (HIT) played a significant role in the production of CZ-7.

The research group directed by Prof. Zhang Binggang and Prof. Feng Jicai from State Key Laboratory of Welding and Joining HIT is dedicated long-term to research the electron beam welding of advanced materials and dissimilar materials. The new generation of "High-Thrust Liquid-Oxygen/ Kerosene Engine" which employs steel and copper as the new kind of thrust chamber, is the power core of the "CZ-7". High strength copper/steel dissimilar joints technology is one of the key technologies to develop the new generation of engine. Based on the welding characterization of dissimilar materials, Prof. Zhang Binggang and Prof. Feng Jicai proposed a composite interface reinforcement theory and broke through the bottleneck of penetration control,



The typical electron beam welding-brazing steel/copper dissimilar joint

stress relief and microstructure regulation in thin-walled structures welding by developing an electron beam welding-brazing technique. The technical performance indicators of the high-quality steel/copper dissimilar joints have reached an international advanced level, which promoted the welding of specific structural components in the aerospace engine to an international advanced level.

CZ-7 is a new generation launch vehicle with the advantages of non-toxic, non-pollution and high reliability. One of CZ-7 highlights is the LOX/kerosene engine. If the engine is the "heart" of the rocket, then the fuel transportation system can be called the "blood vessels". Five-way components are the key part in the transportation system, which is placed into an extremely severe environment at low temperature of -183 ℃ with continuous impact and vibration. Therefore, integrated components are the best choice for CZ-7 rather than the old one. However, the integral five-way components are very difficult to manufacture using the current technology because of the complex shape and the high standard of thickness distribution, which became the bottleneck problem in the production of CZ-7.

In face of this urgent problem, Prof. Yuan Shijian and his team, from the Engineering Research Centre of Hydroforming (ERC/Hydroforming) in School of Materials Science and Engineering of HIT, were encouraged to take on this tough task by China Academy of Launch Vehicle Technology. Based on their abundant experience about the hydroforming technology, Prof. Yuan proposed a new technology to manufacture the five-way components: because of the characteristics of fluid medium such as "overcoming firmness by gentleness" and "always followed by one's shadow" in hydroforming, a simple flat blank can be deformed into an integral five-way component. Many typical defects including wrinkles, ruptures and surface roughening were solved by the team using a large numbers of numerical simulations and experiments. The integral five-way component was successfully manufactured after overcoming a series of technological obstacles. The first sample and final sample

of this component were qualified to pass the entire tests for CZ-7.

The primary payload on board the maiden launch of the Long March 7 was the Multi-purpose Subscale Spacecraft Reentry Capsule. The capsule undertook the tasks of acquiring aerodynamic data of free flight, exploring reusable design, and verifying the properties and manufacturing technologies of the new metal material for the first time. As the responsible designer of aerodynamic parameters measurement devices, the team led by Prof. Meng Songhe from the Centre for Composite Materials and Structure, School of Astronautics, HIT , proposed the measuring scheme of surface pressures, heat fluxes and internal temperatures of thermal protection structure (TPS) of the capsule, and solved the challenges brought by trepanning, sealing and high temperature expansion of TPS, as well as the survival of the devices in an extreme environment and the matching problem between the devices and TPS. More than forty devices of three kinds were designed and manufactured. The products were installed in the capsule and succeeded in obtaining aerodynamic data in the flight. The new aerodynamic configuration of the reentry capsule was then verified by this datum. The accomplishment of the flight measuring task marks the new level of the in-flight measuring technology, laying the foundation of design and evaluation of TPS and aerodynamic configuration of supersonic vehicles in the future. ■

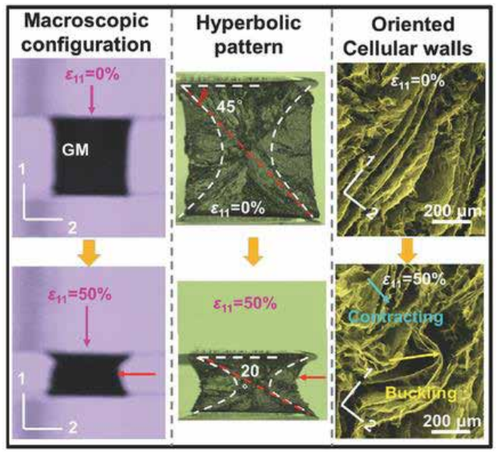
(Picture Source: http://baike.baidu.com/link?url=4qwY-w6ixP66FLBTMJ5saxnezvBSPS-gF_2I3pw3rybYKp1-tkBBCNkBV0nLnLh_I4F02jqEFwsJ0mhgaapA1DLQWSBKZqpK5extr2hDlq_p6qf3RfDTdX5DygGIOQ4qptyl0yvvJ8atx80D3M7CiZGktia-3I48PdKFhDe8dZSypABvL9c917CRr3TkT2yD_pRFHCata1-Pxu0skiAfOxPzB3DbBN8gAwZmgF-3nNGQg_d5fXugUhMOStP1EtM8)

BREAKTHROUGHS IN GRAPHENE METAMATERIALS

A team led by Professor Li Hui from School of Civil Engineering, Harbin Institute of Technology recently published a paper titled "Hyperbolically Patterned 3D Graphene Metamaterial with Negative Poisson's Ratio and Superelasticity" in Advanced Materials (2015 IF: 18.96).

In this research, a 3D ultralight graphene metamaterial (GM) with large negative Poisson's ratio and superelasticity was fabricated by a modified hydrothermal approach and subsequent oriented freeze-casting strategy. Benefiting from the negative Poisson's ratio, well-interconnected scaffolds, and strong π-π interactions among graphene sheets, such GM exhibits superelasticity and tremendous mechanical robustness with ultralarge reversible compressibility (up to 99%), suggesting a promising applicability to technologies including soft actuators, strain sensors, robust shock absorbers and environmental remediation.

The paper was financially supported by the Ministry of Science and Technology, China, the US Air Force Office of Scientific Research, and the US National Science Foundation.■



Reference

Q Zhang,X Xu,D Lin,W Chen,G Xiong,et al. Hyperbolically patterned 3D graphene metamaterial with negative Poisson's Ratio and superelasticity. Advanced Materials, 2016, 28(11):2229-2237

NEW UNDERSTANDING OF THE MECHANISM OF [FE]-HYDROGENASE

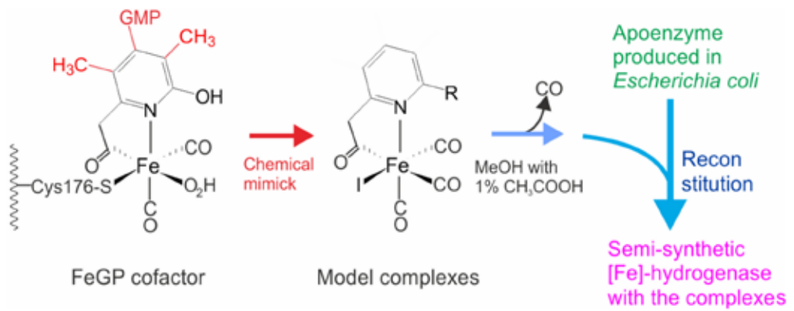
Professor Chen Dafa from the Department of Chemistry and Chemical Engineering, Harbin Institute of Technology, in collaboration with Prof. Shima Seigo from Max Planck Institute for Terrestrial Microbiology and Prof. Hu Xile from Ecole Polytechnique Fédérale de Lausanne (EPFL), recently published a paper titled "Reconstitution of [Fe]-Hydrogenase Using Model Complexes" in the renowned magazine Nature Chemistry.

[Fe]-Hydrogenase transfers the hydride ion to methenyl-H_4MPT^+, which is an intermediate step during the methanogenesis from CO_2 and H_2. However, the mechanism of H_2 activation by [Fe]-hydrogenase is unclear. The paper reported that the reconstitution of [Fe]-hydrogenase from an apoenzyme using two FeGP cofactor mimics creates semisynthetic enzymes. The reconstituted enzyme uses a mimic that contains a 2-hydroxypyridine group restored activity, whereas an analogous enzyme with a 2-methoxypyridine complex was essentially inactive. The findings, together with density functional theory computations, support a mechanism in which the 2-hydroxy group is deprotonated before it serves as an internal base for heterolytic H_2 cleavage. These studies would contribute to our understanding of the necessary primary and secondary coordination environments for iron to activate H_2, a question of considerable applied interest.

Reference

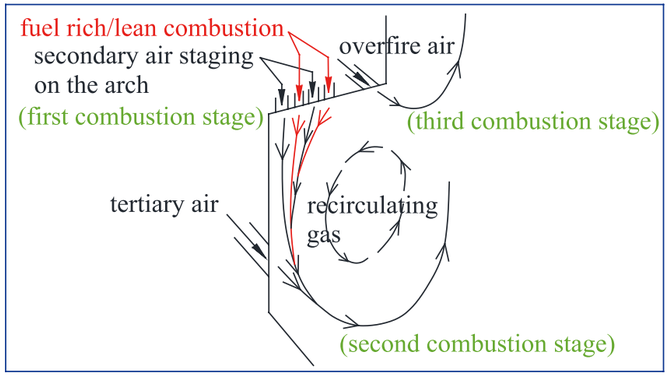
S Shima,D Chen,T Xu,et al. Reconstitution of [Fe]-hydrogenase using model complexes. Nature Chemistry, 2015, 7(12):995

The paper was financially supported by National Natural Science Foundation of China, the Max Planck Society, the PRESTO program of Japan Science and Technology Agency, and the Swiss National Science Foundation.■



BREAKTHROUGHS IN DOWN-FIRED COMBUSTION TECHNOLOGY

A team led by Professor Li Zhengqi from the School of Energy Science and Engineering, Harbin Institute of Technology (HIT) recently published a paper titled "Industrial Application of an Improved Multiple Injection and Multiple Staging Combustion Technology in a 600MWe Supercritical Down-Fired Boiler" in the environmental science magazine Environmental Science & Technology. The team achieved breakthroughs in the down-fired combustion technology.



The down-fired boiler with its advantages in burning lean coal and anthracite has occupied a large market share in China. However, various problems have appeared in its operations, such as asymmetric combustion, large water wall temperature deviation, high NOx emissions and poor burnout, which are seriously harmful to the safety, environmental protection and economy of the down-fired boiler.

In this work, further improvements on the multiple-injection and multiple-staging combustion technology were carried out. The improved technology was applied on a 600MWe supercritical down-fired boiler. The industrial experiments revealed, under conditions of firing anthracite (Vdaf=10%), on the over fire air damper opening increasing from 20% to 70%, the asymmetric combustion and even heat load distribution with small water wall temperature deviation appear in the lower furnace, the ignition distance of fuel-rich coal/air flow reduces from 1.05 m to 0.66 m, the carbon in fly ash increases from 5.65% to 6.4%, and the NOx emissions reduces from 702 mg/m^3 to 575 mg/m^3 at 6% O_2. In addition, the exhaust gas temperature at the air preheater outlet increases from 126.5 °C to 129 °C, and the boiler efficiency decreases from 90.1% to 89.7%. Under optimal operating condition, the NOx emissions and carbon in fly ash attained levels of 589 mg/m^3 at 6% O_2 and 6.18%, respectively. The safety, environmental protection and economy of the down-fired boiler is enhanced significantly.

This work was supported by National High Technology Research and Development Program of China, National Natural Science Foundation of China, Foundation for Innovative Research Groups of the National Natural Science Foundation of China and the Harbin Boiler Company Limited.

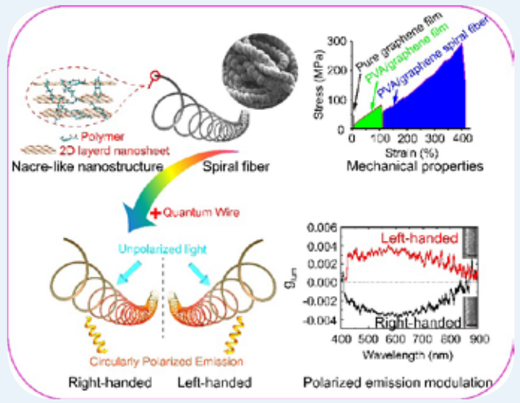
Reference

M Song,L Zeng,Z Chen,Z Li,Q Zhu,et al. Industrial application of an improved multiple injection and multiple staging combustion technology in a 600MWe supercritical down-fired boiler. Environmental Science & Technology, 2016, 50(3):1604

NEW PROGRESS IN FABRICATION OF HIGH TOUGHNESS FIBRE AND ITS APPLICATION IN MECHANICALLY TUNABLE CIRCULARLY POLARIZED LUMINESCENCE

Recently, a team led by Prof. Hu Ping'an and Prof. Wang Zhenlong from the State Key Laboratory of Robotics and System, Harbin Institute of Technology (HIT) published a research paper titled "Multiscale Deformations Lead to High Toughness and Circularly Polarized Emission in Helical Nacre-Like Fibres" in the Nature Communications.

The team achieved a breakthrough in the scalable fabrication of highly stretchable and tough fibres via the synergy between two structural motifs nanoscale brick-and-mortar stacking of platelets and microscale twisting of the fibres. Meanwhile, they demonstrated for the first time mechanically tuning the circularly polarized luminescence by incorporating luminescent CdTe nanowires into the fibres.



Organic-inorganic nacre-like composites excited scientists for decades and have been investigated as thin coatings and films. Realization of composite fibres with biomimetic layered structure enables new mechanical properties, different deformation patterns, and fields of application. The paper demonstrates that nacre-like fibres can be produced by the shear-induced self-assembly of nanoplatelets. The multiscale deformation regime involving solid-state self-organization processes that lead to efficient energy dissipation, resulting in the stretch ability (>400%) and gravimetric toughness (640 J/g). Incorporating CdTe nanowires into fibres imparts the mechanically tunable circularly polarized luminescence. This novel optomechanical property highlights the emergence of novel possibilities for engineering chiral nanomaterials that may be useful for remote monitoring of materials' strains.

This paper was financially supported by the National Natural Science Foundation of China.

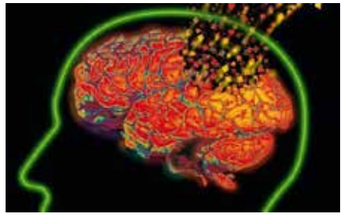
Reference

J Zhang,W Feng,H Zhang,Z Wang,HA Calcaterra,et al. Multiscale deformations lead to high toughness and circularly polarized emission in helical nacre-like fibres. Nature Communications, 2016, 7:10701

NEW FINDINGS ON ALZHEIMER'S DISEASE

A team led by Prof. Jiang Qinghua from the School of Life Science and Technology, Harbin Institute of Technology, recently published a paper titled "Alzheimer's Disease CD33 rs3865444 Variant does not Contribute to Cognitive Performance" in the Proceedings of the National Academy of Sciences of the United States of America (PNAS).

Alzheimer's disease (AD) is a complex and very common neurodegenerative disease in the elderly. Previous studies identified CD33 rs3865444 polymorphism to be significantly associated with AD susceptibility. The team analyzed four large-scale GWAS datasets to investigate the common variants associated with childhood intelligence (general cognitive function in childhood, 17,989 individuals aged 6-18 years), cognitive performance in a general population aged >30 years (106,736 individuals, 96.0% of the individuals were aged >30 years), as well as educational attainment in a general population aged >30 years (101,069 individuals, 96.0% of the individuals were aged >30 years). Two variables were used to measure the educational attainment, a quantitative variable for an individual's years of schooling (Edu Years) and a binary variable for college completion (College).



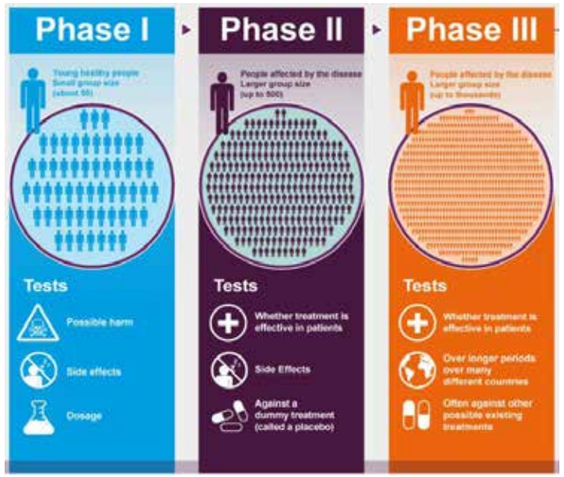
The paper demonstrates that the rs3865444 polymorphism is not significantly associated with childhood intelligence, cognitive performance and educational attainment (P >0.05). These findings provide important supplementary information about the role of CD33 and other genes in cognitive decline.

This work was financially supported by National Nature Science Foundation of China.

Reference

G Liu,Q Jiang. Alzheimer's disease CD33 rs3865444 variant does not contribute to cognitive performance. Proceedings of the National Academy of Sciences of the United States of America, 2016, 113(12):201600852

BREAKTHROUGHS IN ASSESSMENT OF TREATMENT AND PLACEBO EFFECTS



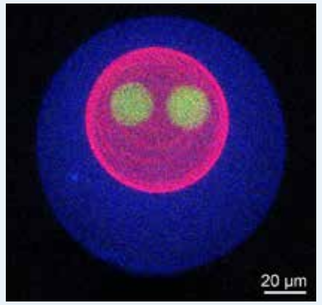
Doctor Liu Wei from the Department of Mathematics, Harbin Institute of Technology, in collaboration with Mathematical Statistician Zhang Zhiwei et al. from Center for Devices and Radiological Health, US Food and Drug Administration, recently published a paper online titled "Joint Estimation of Treatment and Placebo Effects in Clinical Trials with Longitudinal Blinding Assessments" in Journal of the American Statistical Association, which was a new theory concerning the assessment of treatment and placebo effects.

In some therapeutic areas, treatment evaluation is frequently complicated by a possible placebo effect (i.e., the psychobiological effect of a patient's knowledge or belief of being treated). When a substantial placebo effect is likely to exist, it is important to distinguish the treatment and placebo effects in quantifying the clinical benefit of a new treatment. These causal effects can be formally defined in a joint causal model that includes treatment (e.g., new versus placebo) and treatmentality (i.e., a patient's belief or mentality about which treatment she or he has received) as separate exposures. Information about the treatmentality exposure can be obtained from blinding assessments, which are increasingly common in clinical trials where blinding success is in question. Assuming that treatmentality has a lagged effect and is measured at multiple time points, this article is concerned with the joint evaluation of treatment and placebo effects in clinical trials with longitudinal follow-up, possibly with monotone missing data. Several methods adapted from the longitudinal causal inference literature are proposed and applied to a weight loss study.

Reference

W Liu,Z Zhang,RJ Schroeder,et al. Joint estimation of treatment and placebo effects in clinical trials with longitudinal blinding assessments. Journal of the American Statistical Association, 2016, 2015(514):1-32

NEW FINDINGS ON CONSTRUCTION OF HIERARCHICALLY STRUCTURED PROTOCELL MODELS



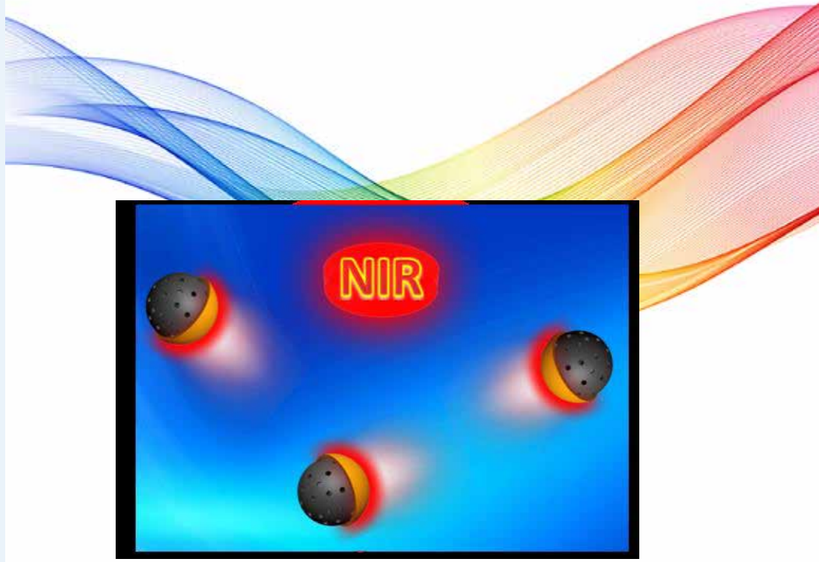
Professor Huang Xin from School of Chemistry and Chemical Engineering, Harbin Institute of Technology in collaboration with Professor Stephen Mann from the University of Bristol, UK, recently published a paper titled "Hierarchical Proteinosomes for Programmed Release of Multiple Components" in the renowned journal Angewandte Chemie International Edition. The research showed a breakthrough in the design and construction of a next generation of hierarchically structured protocell models based on multi-tiered micro-compartmentalized colloidal-scale objects.

Compartmentalization is a fundamental requirement for many biochemical processes, critical to the evolution of eukaryotic cells, and instrumental in the origin of life. Many cellular organizations owe their complexity and efficiency to multi-compartmentalized structures, which in the form of membrane-bounded intracellular organelles provide specialized functions such as energy transduction, positional assembly and protein trafficking which collectively provide the cell with spatiotemporal control over informational and metabolic processing. Based on these considerations, the researchers showed a facile but efficient route to hierarchically organized multi-compartmentalized proteinosomes based on a recursive Pickering emulsion procedure using amphiphilic protein–polymer nanoconjugate building blocks. The number of incarcerated guest proteinosomes within a single host proteinosome could be controlled, and enzymes and genetic polymers encapsulated within targeted sub-compartments to produce chemically organized multi-tiered structures. Specially, three types of spatiotemporal response—retarded concomitant release, synchronous release or hierarchical release of dextran and DNA were demonstrated based on the sequential response of the host and guest membranes to attack by protease, or through variations in the positioning of disulfide-containing crosslinks in either the host or guest proteinosomes integrated into the nested architectures. Overall, the research provided a step towards the construction of hierarchically structured synthetic protocells with chemically and spatially integrated proto-organelles, accordingly, prompting the development of hierarchical protocells with specialized sub-compartments (proto-organelles) which increased the functional complexity and processing ability of these synthetic micro-ensembles.

The research was financially supported by Thousand Young Talents Program, National Natural Science Foundation of China, and European Research Council.

Reference

X Liu,P Zhou,Y Huang,M Li,X Huang,et al. Hierarchical proteinosomes for programmed release of multiple components. Angewandte Chemie, 2016, 55(25):7095



BREAKTHROUGHS IN NANOSCALE SWIMMERS POWERED BY NEAR INFRARED LIGHT

Professor He Qiang from Academy of Fundamental and Interdisciplinary Science, Micro/Nano Technology Research Center, Harbin Institute of Technology (HIT) recently published a paper titled "Near Infrared Light-Powered Janus Mesoporous Silica Nanoparticle Motors" in Journal of the American Chemical Society. He Qiang's group has synthesized the first sub-100 nm, near infrared light (NIR)-powered Janus mesoporous silica nanoparticle motors. The Janus motors, which are nanoscale swimmers, are prepared by combining a sol-gel method and sputtering coating of gold on one side of nanoparticles. Due to high loading capacity of mesoporous silica nanoparticles, such fuel-free nanomotors show considerable potential as new-generation drug vehicles.

In many science fictions and films, people often imagine that various micro-/nanoscale machines can move in the blood flow freely and complete biomedical tasks such as targeted drug delivery, atherosclerosis treatment, blood clot removal, and wound cleaning. During the past half a century, scientists have been actively exploring and managing in an attempt to turn these imaginative ideas into reality. A variety of self-propelled micro-/nanomachines have been fabricated by diverse physicochemical strategies. However, chemically powered motors still have some limitations, including severe side effects of chemical fuels to the living organisms and their size, which are often larger than a few hundred nanometers, for the applications in biomedical fields, especially drug delivery and disease diagnosis. Thus, it is very important to develop the "fuel-free" nanomotors that could be driven by various physical triggers, such as electric field, sound wave, magnetic field, and light. These nanomotors show a significant improvement in maneuverability and provide a transportation platform in a biofriendly manner.

Professor He Qiang's group has made the latest breakthroughs in the "fuel-free" propulsion based on their earlier studies on self-propelled nanomotors. The research results show that the nanomotors with the size of 50 nm can move at a superfast speed of 950 body lengths/s in the water upon the illumination of a NIR laser. The voyaging speed mainly depends on the power of the NIR laser.

Reference

M Xuan,Z Wu,J Shao,et al. Near infrared light-powered janus mesoporous silica nanoparticle motors. Journal of the American Chemical Society, 2016, 138(20):6492

Interestingly, the reversible "on/off" motion of the nanomotors can be conveniently achieved by switching the NIR laser on/off remotely. Moreover, both experiments and theoretical calculation have displayed that the movement mechanism of the nanomotors attributes to the photothermal effect on the half gold nanoshell upon the NIR laser and the resultant local temperature gradient on the surface of the Janus nanoparticle, resulting in the self-thermophoresis of nanomotors. Such self-thermophoresis force could effectively overcome the Brownian motion, actually change the force equilibrium of nanomotors, and achieve the NIR light-powered propulsion of nanomotors.

This paper was financially supported by State Key Laboratory of Robotics and System (HIT) and National Natural Science Foundation of China.

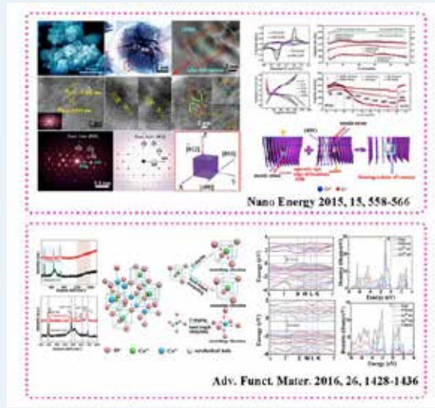
NEW PROGRESS IN NOVEL Co_3O_4 LITHIUM-ION BATTERY ANODE MATERIALS BY CRYSTAL STRUCTURE MODIFICATION

The Energy Conversion Materials Chemistry Group led by Prof. Chen Gang from the Department of Materials Chemistry, School of Chemistry and Chemical Engineering recently achieved a notable progress in novel Co_3O_4 lithium-ion battery anode materials. The paper titled "Edge Dislocation Surface Modification: A New and Efficient Strategy for Realizing Outstanding Lithium Storage Performance" was published in Nano Energy. Soon, the further research work titled "Template-Based Engineering of Carbon-Doped Co_3O_4 Hollow Nanofibers as Anode Materials for Lithium-Ion Batteries" was published in the renowned material science magazine Advanced Functional Materials. These achievements provide new ideas for the development of Co_3O_4 electrode materials.

As known well, Co_3O_4 is emerged as an attractive transition-metal oxide electrode material for lithium-ion batteries, owing to its higher theoretical capacities compared with conventional graphite. Nevertheless, poor electric conductivity, large volume changes during Li+ insertion/extraction and subsequently electrode pulverization all together prevent its practical usage.

In the first paper, Prof. Chen's group proposed an original methodology on the basis of edge dislocation surface modification toward buffering the volume expansion during charge-discharge process. According to this strategy, Co_3O_4 anode with big vacancy, nucleation sites, active Co^{2+} atoms and open channels was fabricated, leading to a breakthrough in cycling stability and rate capability. In the latter work, by employing nonmetallic doping, intrinsic enhancement was realized in the conductivity of Co_3O_4 anode material, contributing to the remarkable improvement in electrochemical performance. The above research was financially supported by National Natural Science Foundation of China.

The research group led by Prof. Chen always focuses on talents-training. In the past 5 years, students from the research group have received a number of awards, such as China Youth Science and Technology Innovation Award, National Excellent Doctoral Dissertation Nomination Award and Chinese Academic New Artist Ministry of Education Doctoral Postgraduate (twice). The research group was also awarded as Top 10 Postgraduate Team of HIT.



Reference

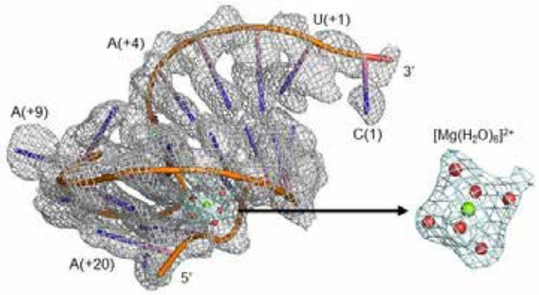
C Yan,G Chen,et al. Edge dislocation surface modification: a new and efficient strategy for realizing outstanding lithium storage performance. Nano Energy, 2015, 15:558-566

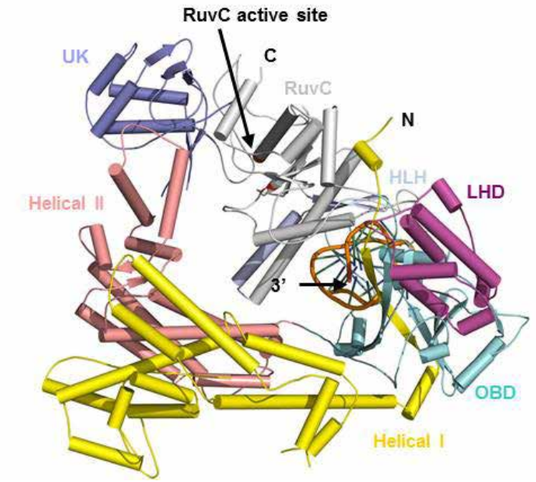
BREAKTHROUGHS IN CRYSTAL STRUCTURE OF CPF1 IN COMPLEX WITH CRISPR RNA

In April 2016, the group led by Professor Huang Zhiwei from the School of Life Science in HIT published a research paper titled "The Crystal Structure of Cpf1 in Complex with CRISPR RNA" in the journal Nature as Advance Online Publication. The study reported the crystal structure of Cpf1 from Lachnospiraceae bacterium ND2006 (LbCpf1) in complex with a crRNA at 2.38 Å resolution. The work revealed the crRNA recognition mechanism of LbCpf1 and provided structural biology evidence for pre-crRNA maturation conducted by Cpf1.

Most of archaea and many bacteria encode a diverse set of CRISPR-Cas (clustered regularly interspaced short palindromic repeats and CRISPR-associated proteins) systems as an adaptive immune system to defend themselves against phage infection. After integration of short segments of invader-derived DNA or RNA (known as a protospacer) into a CRISPR array within the host genome, expression and processing of the precursor CRISPR RNAs (crRNAs) produces mature crRNAs which guide effector protein of a large single Cas protein or a Cas protein complex to target and cleave foreign DNAs (or in some cases, RNAs) bearing complementary sequences, which is called "interference". The CRISPR-Cas9 systems have been harnessed as a two-component programmable system for genome editing.

Recently, a previously uncharacterized class2 system, CRISPR-Cpf1 system, assigned to type V, has been shown to mediate robust DNA interference in human cells, while demonstrating some features largely distinct from that of Cas9 system.





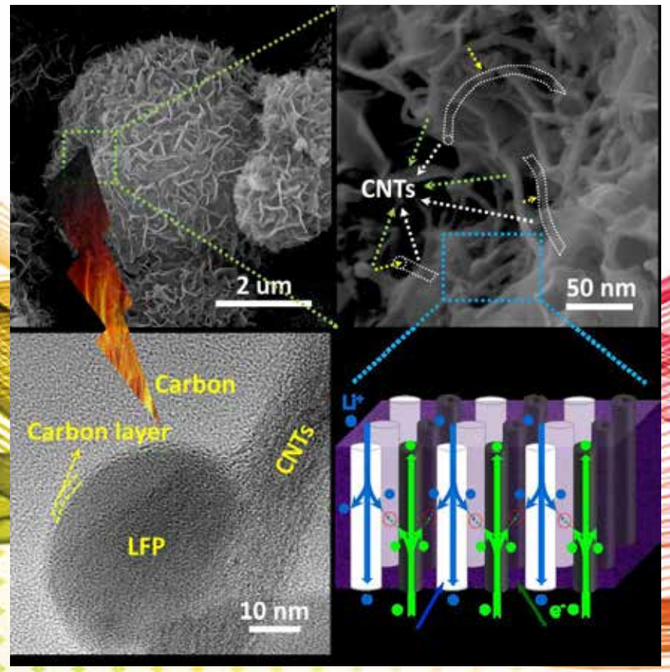
In the study, Huang's team first determined the crystal structure of Cpf1 in complex with crRNA. The structure of Cpf1-crRNA is maintained in a monomer state. A large positively charged groove formed in the center of triangle structure, suggesting that the groove could be the nucleic acid substrate binding site. The highly distorted crRNA is almost fully accommodated in the positively charged groove of NBD, leaving the 3' end of the guide nucleotide of the crRNA positioned in the central channel between the RuvC domain and Helical domains, suggesting that the structure of Cpf1 may undergo dramatic conformational change upon crRNA binding, which was further supported by EM and biochemical data. The structure revealed that the recognition of crRNA by LbCpf1 is mainly through the secondary structural features in the stem region, whereas in some specific region is sequence-dependent. Interestingly, a $[Mg(H_2O)_6]^{2+}$ ion-bound crRNA was found to be important for Cpf1 recognition.

This high-resolution complex structure, along with functional study enhanced our understanding of how the crRNA-guided CRISPR system works, and paved the way for engineering Cpf1 to improve its efficiency and specificity for genome editing. It is worth mentioning that this is the second research paper published in Nature in the host-pathogen interaction field by Huang Zhiwei's laboratory that was established in 2012. ■

Reference

D Dong,K Ren,X Qiu,J Zheng,M Guo,et al. The crystal structure of Cpf1 in complex with CRISPR RNA. Nature, 2016, 532(7600):522

ADVANCE IN LIFEPO$_4$-BASED HYBRID ENERGY-STORAGE COMPOSITES



Doctor Wang Bo and Professor Wang Dianlong from School of Chemistry and Chemical Engineering, Harbin Institute of Technology (HIT), in collaboration with Professor Zhao Xiusong from School of Chemical Engineering, the University of Queensland (UQ), recently published a paper titled "A Hierarchical Porous C@LiFePO$_4$/Carbon Nanotubes Microsphere Composite for High-Rate Lithium-Ion Batteries: Combined Experimental and Theoretical Study" in the renowned energy and material science magazine Advanced Energy Materials. This work achieved breakthroughs in LiFePO$_4$-based hybrid energy-storage composites with hierarchically multi-dimension architectures to well combine the advantages of LiFePO4 (LFP) and carbon nanotubes (CNTs).

Lithium-ion batteries (LIBs) have been widely investigated in the past two decades for energy storage in electric vehicles (EVs) and hybrid electric vehicles (HEVs), for the purpose of displacing fossil fuel and remitting environmental issues. Being a promising candidate of LIBs cathode material, olivine-structured LFP owns numerous advantages including low cost, environmental compatibility, superior thermal stability and safety. The major problems associated with LFP-based electrode however still lie in the fact of its poor electronic conductivity and low Li+diffusivity, and thus limiting its high-rate (> 50 C) performance, which is extremely important to power EVs and HEVs. This work developed a new design by decorating porous LFP microspheres with CNTs achieving favorable kinetics for both electron and Li+ to improve the electrochemical properties of the LFP-based cathode hybrid. Therefore, by combining large tap density and improved mixed (electronic and ionic) conductivity, high volumetric energy density and superior rate capacity as well as stable cycling performance are simultaneously achieved for C@LFP/CNTs, indicative of its potential application as a promising cathode candidate material directed at the EV and HEV markets. To deeper understand its electrochemical behavior, a combined experimental and density functional theoretical (DFT) calculation study is also introduced. Furthermore, in view of the ease of fabrication in terms of constructing these or similar structures, the synthesis process and research concept could also be extended to many other functional materials for different applications.

This work was financially supported by China Scholarship Council and the Fundamental Research Funds for the Central Universities (HIT) as well as Australian Research Council. ■

Reference

B Wang,T Liu,A Liu,G Liu,L Wang,et al. A hierarchical porous C@LiFePO4/Carbon nanotubes microsphere composite for high-rate lithium-ion batteries: combined experimental and theoretical study. Advanced Energy Materials, 2016, 6(16):1600426

NEWS & EVENTS

HIT CELEBRATED THE 1ST CHINA AEROSPACE DAY

The State Council approved establishing April 24 as China Aerospace Day in a response to the Ministry of Industry and Information Technology and the State Administration of Science Technology and Industry for National Defense. The day will be celebrated annually starting this year, and the celebration details and other issues will be decided by the two departments and other related agencies, according to the State Council. At the press conference in Beijing, Xu Dazhe, Director of the China National Space Administration, said the move reflects the country attaching great importance to the space industry.

Over 100 science lectures and public opening events have been held in schools, universities, and key aerospace labs and bases across China for the first national aerospace day. 84-year old Prof. Liu Tun from School of Astronautics delivered popular science lecture titled “China’s Satellites” and explained why April 24th was China Aerospace Day. “China's first man-made earth satellite ‘Dong Fang Hong 1’ was successfully launched on April 24th, 1970. It is seen as a breakthrough and foundation-laying in the country's space industry. For a long time, Harbin Institute of Technology has been the cradle for China's space industry talent. We will continue to make contributions to China’s space industry.”

At the event, students from primary schools and secondary schools in Heilongjiang Province visited HIT Space Museum, Qitian Technology Innovation Base and Qiji Laboratory. They made model planes, participated in the Quadcopter competition and watched rocket launching and slider performance. Dreams of space can start from very young. Today could be a day of enlightenment for some.

In the “China’s Space Dream, HIT’s Space Love” Youth Symposium, Prof. Wu Ligang from School of Astronautics, representatives from Small Satellite Group, student leader representatives and national defense student representatives had extensive discussion on the relationship between HIT and China’s space industry, space dream and how to put innovation into practice.

HIT Museum published a column in Wechat public platform, introducing HIT alumni Sun Jiadong (Chief Designer of Chinese Lunar Exploration Program) and Hu Shixiang (Deputy Commander of Chinese Lunar Exploration Program, Vice Minister of General Armament Department of China, and Chief of Staff in China’s Commission of Science Technology and Industry for National Defense). HIT postgraduate volunteer teachers in Sichuan, Shanxi, Yunnan and Tibet promoted space spirit and spread space science knowledge. In HIT Weihai campus, Yue Ronggang, Deputy Director of Designers from China Academy of Space Technology, introduced the latest progress of manned spaceflight in China in order to make students know more about outer space programs.

2016 marks the beginning of China's 13th five year plan. The Mars exploration program for this year will also be approved. The “Chang’e-4” project will kick off, and the “Chang’e-5” project will enter a critical period. Also, the BeiDou Satellite Navigation System will further expand its coverage around the world. We will also see the maiden flights of Long March 5 and 7 launch vehicles as well as the launches and the docking of the Tiangong-2 and Shenzhou-11 this year. The first China Aerospace Day has set the goal to link the public to the mysteries of science, and let them have a deeper glimpse into the subject. It also demonstrates China's principle of peaceful use of outer space, and shows its aerospace workers' ambition in striving for innovation.■

INTERNATIONAL CULTURE CARNIVAL 2016



On June 5, "Liu Dong Zhong Guo - International Students Sunshine Sports & Culture Tour" and the "2nd HIT International Culture Carnival" was held in Harbin Institute of Technology. Wang Shuquan (Party Secretary of HIT) attended the opening ceremony.

Vice President of HIT Ren Nanqi delivered the opening speech. He hoped that the event would improve campus atmosphere and construct better environment that attract domestic and international scholars and students. It was a good opportunity to improve HIT's international image, cultivate international communication capacity and pay tribute to HIT's Centennial Anniversary.

11 university teams from Heilongjiang Province gave brilliant performances. HIT team performed a dance while dressing in Han Chinese Clothing and Sichuan opera face. The team from Heilongjiang University of Chinese Medicine showed "Wu Qin Xi Exercises (Five-animal Exercises)" that was the Chinese ancient exercise method. The team from Heilongjiang University performed Tai Chi and modern dance. The opening ceremony combined the traditional and modern art, which was a most fascinating international feast.

At every country's booth, enthusiastic volunteers introduced the general situation and local customs and practices of the country. People of all colours were attracted and collected the national flag stickers in the memorial album. During the event, visitors interacted with international students, exchanged ideas, took photos and learned the national dance. People all enjoyed the International Culture Carnival as a big party. ■



PRESIDENT ZHOU YU ATTENDED THE "UNIVERSITY PRESIDENTS' FORUM 2016"AND "SUMMIT FOR PRESIDENTS OF WORLD CLASS UNIVERSITIES"

On April 7th and 8th, the "University Presidents' Forum 2016"and "Summit for Presidents of World Class Universities" were held at Shanghai Jiao Tong University and Xi'an Jiao Tong University. The Vice Minister of Education, Top 9 universities of "985 Project" (C9), three universities in Hong Kong (H3), the Russell Group, League of European Research Universities (LERU) and Australian Group of Eight (Go8) attended the meeting.

During the meetings, HIT President Zhou Yu gave a speech titled "The Role Definition of Research – Oriented Universities in National Innovation System". He explained the universities played a significant role in leading human civilization, cultivating innovative talents, innovating in science and technology, driving regional development, promoting industrial progress and promoting innovative culture. He also put forward the five views: firstly, research universities drive the national innovation system; secondly, the mission of a university is to lead human civilization and social progress; thirdly, the responsibility of research universities is to drive regional economic development; fourthly, the obligation of research universities is to promote industrial progress; at last but not the least, the universities always seek to promote the formation and development of innovation culture.

During the discussion of "Mutual Reference of University's Mission and Cultural Diversity" in the parallel forum, President Zhou was the only president representative from China. Mr. Zhou pointed out that creating innovative culture was an important part of the national innovation system. One of the missions of universities in this new era is to cultivate the innovative culture, which should not only aim at granting degrees to students, but also cultivating students' innovative spirit and creating innovative cultural atmosphere, so as to cultivate more innovative talents, research more innovative products, to serve in the construction of an innovative country and drive the progress of human civilization. We are not pursuing the large scale or comprehensiveness of the university, but the distinctiveness and the outstanding ability of cultivation. Every university should have their own characteristics to promote diversified development. ■

HEILONGJIANG TECHNOLOGY BUSINESS DELEGATION VISITED BRITAIN

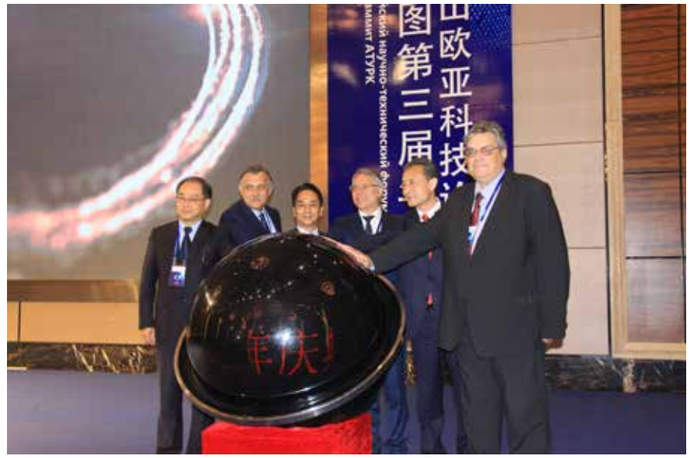
On June 6 and 7, Deputy Party Committee Secretary and Governor of Heilongjiang Province Lu Hao leading Heilongjiang technology business delegation visited Britain. President of HIT Zhou Yu was invited to accompany. In the symposium, they promoted collaboration with graphene researchers from Imperial College London and the University of Manchester, and exchanged ideas with HIT alumni in the University of Manchester.

In Imperial College London, the delegation had an in-depth discussion on industrialization of scientific and technological achievements with David Gann Vice-Chancellor of Imperial College London. They also visited Data Science Institute and Lightweight Manufacturing Laboratory at the Department of Mechanical Engineering to learn the latest academic achievements and their industrialization modes. After finding out so many researchers graduated from HIT, Lu Hao was very proud of them and hoped that they would contribute to the development of Heilongjiang Province.

At the Graphene Research Centre of the University of Manchester, delegation had an intensive discussion with President & Vice-Chancellor Prof. Dame Nancy Rothwell and 2010 Nobel Laureate in Physics Konstantin Novoselov on how to industrialize the scientific and technological achievements by enterprises, governments and higher education institutions. They also exchanged ideas on how to enhance collaboration between Heilongjiang Province and the Graphene Research Centre of the University of Manchester. Consul- General in Manchester Li Yongsheng and Consul Lv Xiaomei attended the event.

In the HIT alumni symposium, Dr. Li Xin and Dr. Tian Yingtao introduced the development of the HIT Alumni Association in the UK. Lu Hao was delighted to see so many HIT alumni studying and working in the UK. He briefly introduced Heilongjiang Province's new business models to promote the industrialization of scientific and technological achievements and the implementation of new "Masses Entrepreneurship and Innovation" policy, encouraging them to study hard and be a part in the development of their hometown. President of HIT Zhou Yu hoped that they would insist on HIT motto "Being rigorous in qualifications of graduation; Making every endeavour in education" to maintain the rigorous attitude and spirit in study and work, and finish the study as soon as possible to return home. ■

“AOSHAN EURASIAN SCIENCE AND TECHNOLOGY FORUM 2016” AND “THE 3RD ANNUAL CONFERENCE OF ASRTU” HELD



From May 24th to 26th, “Aoshan Eurasian Science and Technology Forum 2016 and the 3rd Annual Conference of ASRTU” which was co-sponsored by ASRTU (Association of Sino-Russian Technical Universities) and Qingdao government was held in Qingdao, which implemented the "One Belt One Road" strategy and deepen dialogue and exchanges between China and Russia, in the fields of the education, culture, science and technology. Ren Nanqi and Xu Xiaofei, Vice Presidents of HIT, attended related activities.

During the opening ceremony, representatives of three rotating presidency of ASRTU pressed on the starting ball of the 5th anniversary ceremony. Ren Nanqi and Aleksandrov awarded memorial trophies to the second-term presidency universities, Tongji University and ITMO University, and the third-term presidency universities, Northwestern Polytechnical University and Moscow Aviation Institute.

The conference issued the “Declaration of Aoshan Eurasian Science and Technology Declaration”, declaring the official foundation of the forum with the permanent location of ASRTU official headquarters being in Aoshanwei, Jimo. By taking the opportunity of "One Belt One Road" and the strategy of Eurasian Economic Union, and taking the advantages of geographical positions and resources of advanced technologies, the forum attempts to build a Europe-Asia technology innovation cooperation platform, to promote technology cooperation in Northeast Asia, Southeast Asia, West Asia and the European area, and to accelerate a Eurasian community of scientific and technological innovation. It will also help upgrade the technology innovation capacity and high-end manufacturing level.

At the 5th Anniversary Celebration Dinner, representatives of teachers and students from HIT MUSICA Indoor Mixed Chorus, Russian Culture Centre in Beijing, Bauman Moscow State Technical University and Gubkin Russian State University of Oil and Gas performed Jasmine, A Night in the Suburbs of Moscow, Katyusha, and Auld Lang Syne and other classic Chinese and Russian songs, giving their best wishes to the 5th anniversary of ASRTU.

Association of Sino-Russian Technical Universities (ASRTU) was co-founded by Harbin Institute of Technology and Bauman Moscow State Technical University in March 2011, aiming to assemble Sino-Russian elite engineering universities, cultivate top-quality talents, promote Sino-Russian talent exchange and technological cooperation, and accelerate the mutual development of innovation-based economy. After five years of development, the number of ASRTU member universities increased to fifty. With the influence of ASRTU keeps extending, it has become a significant bridge for the science and cultural communication of Chinese and Russian universities.

INTERNATIONAL STUDENTS GRADUATION CEREMONY 2016

On June 20, more than 300 international students were issued graduation certificates in the International Students Graduation Ceremony 2016 held in the HIT Activity Centre.

Vice President Ren Nanqi delivered a speech to congratulate all international graduates and to appreciate faculty's hard work. The progress of International Student Centre's administration was remarkable. He hoped that the international graduates would apply what they've learned in their own countries and be the bridge of friendship to make contributions to establishing the prosperous world.

Prof. Liang Dapeng from School of Economy and Management and lecturer Zhang Hong from the Chinese Training Department conveyed their best wishes to international graduates and hoped they could carry forward HIT spirit and promote the culture exchange among countries.

Student representatives from Iran and Korea delivered speeches in the ceremony. They shared their experiences and gains in study, research, social practice and so on in HIT. They expressed gratitude to the teachers' guidance in study and the concern in life, appreciated the care and encouragement from the schoolmates, and committed to studying hard and winning honour for HIT. Wherever they are, they would always remember the life in HIT and the school motto.

VICE PRESIDENT DING XUEMEI ATTENDED CAUSTL 2016

On April 21, China-Australia University Summit on Teaching and Learning 2016 (CAUSTL 2016) was held in Xi'an Jiao Tong University. Representatives of more than 20 universities and institutions from C9 and Go8 got together and had deep discussion on the topic "Innovation and Entrepreneurship: Cultivating Future-Needed Talents." Vice President Ding Xuemei attended the summit and gave a speech at the opening ceremony.

Ding Xuemei pointed out, "Innovation and entrepreneurship" have become hot topics all over the world. Universities are the key elements of national innovation system, with the responsibility of leading human civilization and social progress. Universities are playing more and more important role in the aspects of cultivating innovation talent, developing innovation culture, science and technology innovation, and system innovation. For the time being, domestic universities have made several attempts toward innovation and entrepreneurship, such as establishing the innovation and entrepreneurship university alliance, and setting new curriculum of innovation and entrepreneurship.

"CAUSTL" was jointly established by Harbin Institute of Technology (HIT) and the University of Adelaide in 2014 on the background of globalization of higher education, aiming at further promoting and widening the long-term friendly cooperation of teaching and student development between the universities and institutions of both countries. The previous two summits were held respectively at HIT in July 2014 and in November 2015 at the University of Adelaide. ■

2016 ASRTU MEETING IN YEKATERINBURG ORGANIZED BY HIT

From June 23 to 26, "2016 ASRTU Meeting in Yekaterinburg" was held in Yekaterinburg, Russia. 140 teachers and students from 28 universities and colleges of ASRTU partook in a series of activities, such as the 4th ASRTU Sino-Russian Symposium on Advanced Materials and Processing Technology, the Doctoral Forum of Advanced Materials and Processing Technology, the regular meetings of ASRTU and the Open Day of ASRTU member university-Ural Federal University.

On June 24, the opening ceremony of "2016 ASRTU Meeting in Yekaterinburg" was held in

the Ural Federal University. Victor Koksharov (President of the Ural Federal University), Andrei Sobolev (Minister of International and Foreign Economic Relations for the Sverdlovsk Region), Dokuchaev (Chairman of Council on Foreign Relations of Yekaterinburg), Li Bingguo (Education Consul of the Chinese Consulate General in Yekaterinburg), Gu Jianzheng (Director of ASRTU Permanent Secretariat in China, and Dean of School of International Education in HIT), Sergey Korshunov (Chief Executive of ASRTU in Russia, and Vice Rector of Bauman Moscow State Technical University) attended the opening ceremony and delivered speeches.

On June 24 and 25, the 4th "ASRTU Sino-Russian Symposium on Advanced Materials and Processing Technology" and "Doctoral Forum of Advanced Materials and Processing Technology" were held successively. More than 90 experts, scholars and young doctoral students from Sino-Russian elite universities participated in the meetings and approximately 100 abstracts were received. The participants had an extensive discussion on the composite materials, nano materials, thin-film materials, advanced manufacturing technology and other frontier issues. Prof. Geng Lin, Prof. Shao Wenzhu and Prof. Ding Hongsheng from School of Materials Science and Engineering of HIT made reports. Ph.D. Wang Shaoquan won the Excellent "POSTER" Prize.

In the regular meeting of 2016 ASRTU, delegates exchanged ideas and discussed on the future development of ASRTU, high-end talent cultivation and research collaboration. Gu Jianzheng made a report of the achievements made by ASRTU in the past five years and proposed the development plan of "ASRTU TECH 2020". Both sides reached many consensuses: building the platform of talent cultivation and communication, hosting the interscholastic short-term camp in summer/winter vacation, promoting the short-term exchange program and the joint training postgraduate program, strengthening the comparative study of the teaching method of Sino-Russian higher education, and promoting the experience exchanges on education, technology and humanity.

The activity was hosted by the ASRTU and co-organized by HIT, Bauman Moscow State Technical University and Ural Federal University. It aimed to stimulate the youth's enthusiasm for innovation and to build platform for the experts of Chinese and Russian universities to promote the communication and cooperation of Sino-Russian universities in the fields of humanities and technology.■

INTERNATIONAL STUDENTS CHINESE SPEECH CONTEST 2016

From April 16 to May 6, the 2nd International Students Chinese Speech Contest was held at Harbin Institute of Technology. More than 50 international students from more than 20 countries such as Russia, Korea, the USA, Belgium and Cambodia, participated in the contest.

In 2016, the theme of the contest was "Love Chinese, Love HIT". The Competitors gave quotations from classics and copiously quoted authoritative works, which showed their enthusiasm of learning Chinese language and the understanding of Chinese culture. Their wonderful performances won warm applause and cheers.

Faculty from Publicity Department, Division of Student Affairs, International Program Management Office, International Student Centre and School of Humanities and Social Sciences attended the contest as the judges.■

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