HARBIN INSTITUTE OF TECHNOLOGY
NEWSLETTER 2018 ISSUE 1

HIT TIMES

HIT WON 3 NATIONAL SCIENCE AND TECHNOLOGY AWARDS

CHINA SPACE DAY 2018

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AWARDS & HONORS

HIT WON 3 NATIONAL SCIENCE AND TECHNOLOGY AWARDS

The annual "National Science and Technology Awards" ceremony was held on January 8th, 2018. The event took place at the Great Hall of the People in Beijing. China's most prestigious awards for scientific and technological achievements in 2017 were presented to 271 research projects, including 35 which won the National Natural Science Award, 66 which won the National Technological Invention Award and 170 which won the National Scientific and Technological (S&T) Progress Award. Seven foreign scientists also won International S&T Cooperation Prizes.

Harbin Institute of Technology won 3 awards, including 1 National Natural Science Award and 2 National Technological Invention Awards. A project led by Professor Wu Linzhi won the 2nd Prize of the National Natural Science Award. A project led by Professor Wu Xiaohong and a project led by Professor Ling Xianzhang both won the 2nd Prizes of the National Technological Invention Award. ■

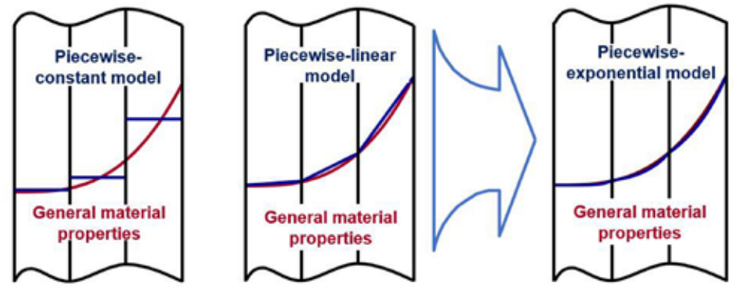
PROFESSOR WU LINZHI WON THE 2ND PRIZE OF THE NATIONAL NATURAL SCIENCE AWARD

The nonhomogeneity and multi-field coupling features of advanced functional materials (AFMs) have received immense attention from the mechanics community. Their security evaluation is a prerequisite to the engineering application of AFMs. Professor Wu Linzhi's team has been working on the fracture mechanics of AFMs for nearly 20 years. A systematic theory was formed to build a solid foundation for the design, analysis and evaluation of AFMs. The team's work has distinct research features and promotes the development of fracture mechanics of AFMs.

According to the property distribution characteristics of typical functionally graded materials (FGMs), the team proposed static and dynamic fracture analysis models of FGMs based on the assumption of material properties described by exponential functions (e.g. exponential-type assumption).

Due to the obvious difference between the exponential-type assumption and actual graded material properties, the team proposed a piecewise-exponential model (PE model). Based on the PE model, the general fracture mechanics method of FGMs was established.

The team established a theoretical fracture model for functional magneto-electro-elastic (MEE) materials according to the multi-field coupling failure characteristics of such materials.■



PROFESSOR WU XIAOHONG WON THE 2ND PRIZE OF THE NATIONAL TECHNOLOGICAL INVENTION AWARD

Due to her outstanding contribution to the surface functionalization of light weight alloys, Professor Wu Xiaohong from the School of Chemistry and Chemical Engineering won the second Prize of the National Technological Invention Award.

Professor Wu has long been engaged in the research of extreme service environment materials and device surface engineering and protection. She set up a research team and is also the director of the Provincial Key Laboratory of Space Materials. Based on her accumulation of research and industrialization, she has built the Research Center of Provincial Functional Film and the Engineering Technology Center of Functional Film Green Manufacturing. Innovative results have been successfully applied to the Chinese "Jade Rabbit" lunar rover and the Fengyun satellite series. She was also nominated as a Chang Jiang Scholar in 2016 and was enrolled in the “National Ten Thousand Talents Program” of China in 2014 for her excellent academic achievements. She has been granted 27 patents for related research. Professor Wu has authored or co-authored over 100 papers published in journals such as Advanced Functional Materials, ACS Applied Materials & Interfaces, Journal of Materials Chemistry A, and Nanoscale. ■

PROFESSOR LING XIANZHANG WON THE 2ND PRIZE OF THE NATIONAL TECHNOLOGICAL INVENTION AWARD

Professor Ling Xianzhang, Director of Geotechnical Engineering from the School of Civil Engineering, Harbin Institute of Technology, presided over the project "Key Technologies for Safety Accurate Monitoring and Efficient Reinforcement of High Dams and Reservoir Dams", which won the 2nd prize of the National Technological Invention Award. The project has won the 1st prize of the Scientific and Technological Progress Award in Hubei Province in 2004, the 1st prize of the Scientific and Technological Progress Award in Guangxi in 2005 and the 1st prize of the Scientific and Technological Progress Award in Heilongjiang Province in 2016.

In order to promote the safe operation of the dam, as well as to incorporate the new technology of reinforcing materials and the key technologies of precise danger monitoring and safety assessment, the project independently invented new materials. These are a new high-performance mineral grouting material, as well as an application technology for danger removal and reinforcement of earth-rock dams and fractured bedrock. In addition, the project has innovatively developed a new material technology of a high-performance series of high-molecular adhesive and CFRP plates for the danger removal and reinforcement of concrete dams. The team has innovatively developed a series of advanced devices and technologies, which include distributed optical fiber sensing, steel corrosion sensing, continuous monitoring of temperature fields, and accurate monitoring of random cracks in concrete dams. The team has also established an analysis theory and method of concrete dam operation states and strong earthquake safety assessments. This project has solved the problems of long-term effective dam reinforcement, accurate monitoring and reliable evaluation.

The research results have been successfully applied in accurate monitoring and efficient reinforcement of dozens of high dams and reservoir dams, such as the second phase concrete gravity dam of the Three Gorges, the Minjiang River Shapai RCC Arch Dam, the Baise Youjiang RCC Gravity Dam, the Chongqing Yutiao Concrete Face Rockfill Dam, the Guangxi Jinlong Reservoir Dam and the Yongjiang Flood Control Dam, the Hunan Xiashantang Reservoir and Shewan Reservoir Dam, the Jiangxi Ludong Reservoir Dam and the Daqing Honghu Reservoir. It reflects the advantages of high technological efficiency, quickness, durability, environmental protection and safety with great social benefits.■

THE STATE KEY LABORATORY OF URBAN WATER RESOURCES AND ENVIRONMENT AWARDED AS THE NATIONAL WORKER PIONEER

On April 28th, 2018, the conference for International Worker's Day was held in the Great Hall of the People. The State Key Laboratory of Urban Water Resources and Environment (SKLUWRE) was awarded as a "National Worker Pioneer" by the All-China Federation of Trade Unions.

SKLUWRE has 75 researchers, including 4 academicians of the Chinese Academy of Engineering, 6 recipients of the National Science Foundation for Distinguished Young Scholars, 9 distinguished professors of the Chang Jiang Scholars, and nearly 600 postgraduate students. The laboratory has an innovation group which is part of the National Natural Science Foundation of China. It also has an innovation team in key areas of the Ministry of Science and Technology.

It strives to be a leader in international academic frontiers and solve major issues in economic and social development. The laboratory has achieved many theoretical breakthroughs, technological innovations and engineering practices in the fields of urban water ecological security, urban water quality assurance, and healthy circulation of urban water. The laboratory has received three 2nd prizes of the National Technological Innovation Award, and five 2nd prizes of the National Scientific and Technological Progress Award. It has also received the title of a national environmental education base for elementary and middle school students, a Worker Pioneer of Heilongjiang Province, and Heilongjiang provincial environmental education demonstration base.■

PROFESSOR XU DIANGUO WON 2018 IEEE IAS OUTSTANDING ACHIEVEMENT AWARD

Professor Xu Dianguo was awarded the 2018 IEEE IAS Outstanding Achievement Award, becoming the first winner of the award from mainland China since this award was established in 1969.

Professor Xu is engaged in AC motor drive, AC servo technology, lighting technology, power quality control technology, renewable energy power transformation technology, and flexible DC transmission technology. He has undertaken and completed a number of projects for the National Science and Technology Major Projects, the National High Technology Research and Development Program (863 Program), the National Science and Technology Support Program, and the National Natural Science Foundation of China. The research group led by Professor Xu has made a number of international contributions in power electronic converters and motor drive control. The research of an AC motor and its drive control are at the international leading level. Professor Xu is an IEEE Fellow, the chairman of the IEEE Harbin Section, and an associate editor of IEEE TIE, IEEE TPEL, IEEE JESTPE. He also served as the general chair of multiple international conferences, the chairman of the International Steering Committees and Technical Program Committees (ITEC Asia-Pacific, ECCE Asia, VPPC), an evaluation expert of the Electrical Subjects of National Natural Science Foundation of China (NSFC), an expert of the Advanced Energy Technical Field of National High Technology Research and Development Program of China (863 Program), an evaluation expert of the National Office for Science & Technology Awards of China, the director of the key laboratory of the ministry of education "Electric Drive and Propulsion Technology", a leader of the international advanced electric drive technology innovation (" 111 "plan), etc.

IEEE IAS is one of the largest societies of IEEE (Institute of Electrical and Electronics Engineers), which is dedicated to meet specific needs in industry and business. IAS participates in making more than 25% of IEEE industry standards and organizes a large number of academic/technical conferences with international influence each year (including the top academic conference IEEE IAS Annual Meeting). The IEEE IAS Outstanding Achievement Award is awarded to an individual who has made an outstanding contribution in the application of electricity to an industry in accordance with the scope of the IEEE Industry Applications Society. The winners are all internationally renowned scientists in the field, and many of them have served as president of the IEEE IAS, PELS, or EIC journals of these two societies.■

PROFESSOR LENG JINSONG ELECTED AS A MEMBER OF THE EUROPEAN ACADEMY OF SCIENCES AND ARTS

On March 3rd, 2018, the European Academy of Sciences and Arts held its annual award ceremony for announcing the 2017 newly elected members. Professor Leng Jinsong from Harbin Institute of Technology was recognized as a Member of the European Academy of Sciences and Arts.

Located in Salzburg, Austria, the European Academy of Sciences and Arts is an interdisciplinary academic organization covering humanities, medicine, arts, natural sciences, social sciences, law and economics, and technology and environmental sciences. It is committed to promoting European cross-border dialogues and exchanges with focuses on advancing front subjects of different disciplines and cultures. The academy has more than 2,000 members and 31 of them are Nobel Prize winners, ranking it as having one of the highest proportions of Nobel Prize winners to members in the world's Academy of Sciences. It is worth noting that there are only about 10% of members from non-EU countries. In 2017, 84 scientists were named as new members all over the world.

Professor Leng from the Centre for Composite Materials and Structures at HIT is a distinguished professor of Chang Jiang Scholars Program of the Ministry of Education, a winner of the National Outstanding Youth Fund, was named in the first batch of scientific and technological innovation leading talents of the "Ten Thousand Plan," and is a "National Talent Engineering" candidate. He currently serves as Vice Chairman of the International Committee on Composite Materials (ICCM) and Vice President of the Chinese Society for Composite Materials.

He was selected as a Fellow of the SPIE in 2010, a Fellow of Institute of Physics (IOP) in 2011, a Fellow of Institute of Materials, Minerals, and Mining (IMMM) in 2011, an Associate Fellow of AIAA in 2012, a Fellow of Royal Aeronautical Society (RAeS) in 2013. He was awarded as the Honorary Professor of Kingston University London (UK) in 2014, the Second Prize of the National Natural Science Award (China) in 2015 and as a Research Giant by University of Southern Queensland (Australia) in 2016.■

PROFESSOR WANG AIJIE ELECTED AS THE CHAIRMAN OF IWA ANAEROBIC DIGESTION SPECIALIST GROUP MANAGEMENT COMMITTEE

The Anaerobic Digestion Specialist Group Management Committee of the International Water Association (IWA) held a general election this year. After the nomination and voting, Professor Wang Aijie from Harbin Institute of Technology was elected as the chairman of the new IWA Anaerobic Digestion Specialist Group.

Professor Wang is a member of the IWA Fellows. She was awarded as a Distinguished Professor of the Chang Jiang Scholars by the Ministry of Education in 2011. She received the National Outstanding Youth Science Fund Award in 2012, the Youth Science and Technology Innovation Talent Award in 2013 and Ten-Thousand People Program: Leading Talent Award in 2016. For many years, she has been engaged in the area of water pollution control and resource recovery, which includes bio-based technology for highly efficient wastewater treatment & water reuse, augmented bioremediation of polluted aquatic environments, and waste organic recycling & resource recovery. A well-recognized feature of her research is the effective integration of fundamental (interdisciplinary) and practically applicable research. Her work on anaerobic acidogensis of recalcitrant organic compounds based on the concept of biological phase separation has been proved to bring substantial benefits to Chinese industries (e.g. pharmaceutical industry, chemical engineering industry), which have already suffered from heavy pollution for a long time. Professor Wang Aijie is honored to be the first Chinese scholar holding this position in International Water Association (IWA).

The IWA owns a professional platform that brings together the world's top resources in the water industry with 49 specialist groups. The Anaerobic Digestion Specialist Group possesses the top anaerobic technology experts in the world, with the largest and the most active number of IWA members. Each year, the Management Committee members of IWA Anaerobic Digestion Specialist Group together with water industry professionals draft professional reports/books, and organize professional conferences and /or activities so as to explore better solutions for water and wastewater treatment. In October 2017, the 15th IWA World Conference on Anaerobic Digestion was successfully held in Beijing, China. Professor Wang Aijie, as co-chairman of the conference, has made great contribution. It is believed that in the next few years, she will continue to lead the IWA Anaerobic Digestion Specialist Group to promote the development of anaerobic technology and its application in wastewater treatment.

8 HIT PROFESSORS SELECTED FOR THE CHANG JIANG SCHOLARS PROGRAM

Professor Liu Gang from the School of Materials Science and Engineering

Professor Liu Li from the School of Chemistry and Chemical Engineering

The Chang Jiang Scholars Program was jointly established by the Li Ka-shing Foundation (LKSF) and the Ministry of Education (MoE) in 1998 to help support the country's pressing need to foster innovation and higher education reform. With the goal of promoting the research levels of the universities in China, the award goes to China's top scholars and young researchers with outstanding academic potential.

In 2018, the Ministry of Education announced the names for the Chang Jiang Scholars Program and 8 professors from Harbin Institute of Technology were on the list.

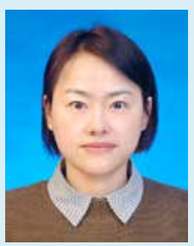
Professor Wu Ligang from the School of Astronautics

Professor Li Longqiu from the School of Mechatronics Engineering

Professor Ouyang Yanfeng from the School of Transportation Science and Engineering

Professor Sui Jiehe from the School of Materials Science and Engineering

Professor Bao Yuequan from the School of Civil Engineering



Professor Zong Yingying from the School of Materials Science and Engineering

PROFESSOR MEI HONGYUAN WON THE BIDDING FOR THE 2022 WINTER OLYMPIC SNOW-VILLA DESIGN PROJECT

Among outstanding design companies in China, an HIT group led by Professor Mei Hongyuan won the bidding for the 2022 Winter Olympic snow-villa exhibition and hotel area design project. This project will be constructed in June of 2018 and is expected to be open in 2020.

Professor Mei's group aims to construct the Olympic snow-villa in the Chongli Taizi city to be a special ice and snow village with a Chinese northern mountain landscape. As the main design area, the exhibition and hotel district will hold the functions of conference, exhibition and housing during the Olympic Games. After the Games, the exhibition and hotel district will

be developed as a world ice and snow sport tourism destination and a public demonstration plot for national green ecological civilization construction with the Winter Olympic Games heritage.

Relying on the deep accumulation and traditional advantages, the architectural design and research institute of HIT keeps leading the domestic architectural creation of sports buildings. The concept of Mei's group is "Dragon Flying and Game Waving" which aims to express the combination of Chinese traditional culture and modern design language. A 600 meter skyline connects the east part and the west part like a vigorous Chinese dragon dancing in the sky. By combining exhibition, conference, high quality residential, leisure, hotel and restaurant sites, the international ice and snow villa will be filled with unlimited vitality and colorful Olympic life in different seasons. The design aims to generate a great and active environment where long undulations of buildings roll with natural mountains and rivers. The new villa will combine the modern design with Chinese traditional language to illustrate great culture and a harmonious image.

HIT TEAM WON THE GLOBAL CHAMPIONSHIP OF ICRA 2018 DJI ROBOMASTER AI CHALLENGE

From May 21st to May 25th, 2018, the ICRA 2018 DJI RoboMaster AI Challenge was held in Brisbane, Australia. "I Hiter," a competitive robot team from Harbin Institute of Technology won the global championship.

ICRA 2018 DJI RoboMaster AI Challenge is co-sponsored by the IEEE International Conference on Robotics and Automation and the DJI RoboMaster Organizing Committee. It is a robot innovation and competition platform that was created for excellent young engineers throughout the world. This year is the second event of the ICRA 2018 DJI RoboMaster AI challenge.

As one of the events of ICRA, the ICRA 2018 DJI RoboMaster artificial intelligence challenge attracted participants from 69 universities in 9 countries and regions, but only 22 teams passed the technical audit and won the qualifications for participating in the competition. This includes teams from Johns Hopkins University (USA), Rose-Hulman Institute of Technology (USA), Nanyang Technological University (Singapore), The University of Melbourne (Australia), University of Alberta (Canada), Hong Kong University of Science & Technology, Harbin Institute of Technology, Zhejiang University, the Institute of Automation of the Chinese Academy of Sciences and other well-known universities and institutes in the world. "I Hiter," the competitive robot team from the School of Mechatronics Engineering completed a series of challenging tasks, such as autonomous positioning of the robot, target recognition and tracking, path planning, independent decision-making and so on in the course of tense confrontation, and they successfully won the grand championship of the ICRA 2018 DJI RoboMaster Artificial Intelligence Challenge.

The ICRA 2018 DJI RoboMaster Artificial Intelligence Challenge is a fully intelligent robot shooting dual competition, and teams participating in this event should independently develop 1-2 artificial intelligence robots.

The competition is carried out in a 5m*8m site which contains different functions, barriers and props. The artificial intelligence robot of each team automatically shoots bullets to compete with the DJI RoboMaster artificial intelligence robot. The scoring standard is based on the number of robots that fight in the game and the amount of the remaining blood, etc. aimed at defeating the official robot to win the competition.

The finale of the competition is divided into four rounds, and the winner goes to the team with the highest score. In the first round of the global finale, the HIT Shenzhen team, led by Professor Liu Yunhui and Professor Meng Qinghu, with 12 members including Han Wenhua, Wang Daochuan,Wang Shungui, et al., performed very well, and its two robots successfully killed two official robots, taking the lead in the competition. The

"I Hiter" team dispatched two robots in the first round and successfully killed one official robot, ranking in third place temporarily. In the second round of the competition, after tense debugging by team members, the robot was restored to its peak state. The "I Hiter" team only dispatched one robot in this round because dispatching one robot in a round and killing two official robots can earn a higher score. It successfully killed two official robots with excellent visual recognition performance and efficient shooting ability, so the "I Hiter" team not only won the applause of the audience, but also broke a record again and ranked in first place steadily. In the end, "I Hiter," led by Professor Zhao Lijun with 7 members including Zhong Xingguang, Huang Hao, Kong Xin, Qi Le, Tian Linrui, Lv Xiaoyang and Li Songwei, won the global championship of the ICRA 2018 DJI RoboMaster AI Challenge.

The Harbin Institute of Technology Competitive Robot Team (HITCRT) was founded in 2002. Under the guidance and organization of the Youth League Committee of HIT and the Youth League Committee of the School of Mechatronics Engineering, it is a student organization established by voluntary participants from different majors from the entire university. In the past 16 years, HITCRT has won 4 championships in international competitions, such as the international championship of the Asia Pacific University Robot competition in 2009, the international championship of the 2016 China - Belarus "Interstellar Exploration" robot competition, the gold medal of the Korean Vertex Design Competition in 2016, and so on. ■

RESEARCH & ACADEMIA

SYSTEMATIC BREAKTHROUGHS IN THE DEVELOPMENT OF METASTABLE SI-B-C-N CERAMICS BY MECHANICAL ALLOYING

A team led by Professor Zhou Yu and Jia Dechang from the Institute for Advanced Ceramics, School of Materials Science and Engineering, Harbin Institute of Technology, recently published a paper titled “Metastable Si-B-C-N Ceramics and Their Matrix Composites Developed by Inorganic Route Based on Mechanical Alloying: Fabrication, Microstructures, Properties and Their Relevant Basic Scientific Issues” in the journal Progress in Materials Science. It is the first paper on advanced ceramics published in this reputable journal at HIT.

In this paper, there are 67 pages including 77 Figures, 9 Tables and 319 references. The current research summarized achievements about Si-B-C-N ceramics and their matrix composites developed by inorganic route based on mechanical alloying made by Zhou’s and Jia’s team over the last decade. For comparison, the relevant research results about polymer-derived Si-B-C-N materials from other research groups were also included in this paper. More importantly, the present development of metastable Si-B-C-N materials was analyzed, and the development trends in future were proposed.

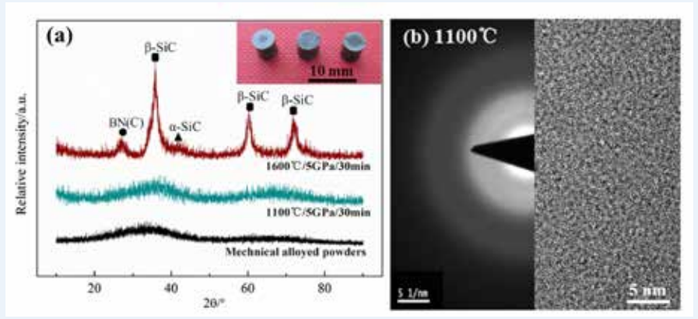


Fig. 1 Amorphous and nanocrystalline Si-B-C-N monoliths prepared by High Pressure Sintering (HPS). (a) XRD patterns of sintered samples at 1100 °C and 1600 °C under 5 GPa. The top-right inset digital picture shows the as-sintered samples. (b) TEM images of sintered samples at 1100 °C and 5 GPa showing a quite good amorphous structure

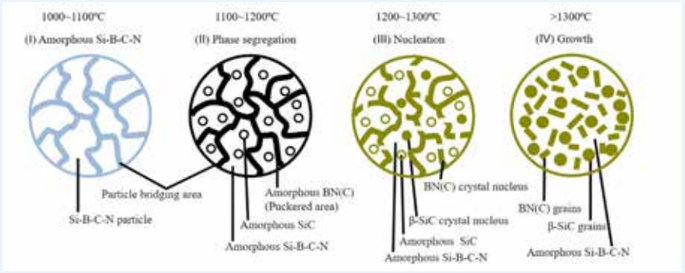


Fig. 2 Schematic of nanostructure development from amorphous Si-B-C-N monoliths during crystallization process at 1000–1400 °C/5 GPa

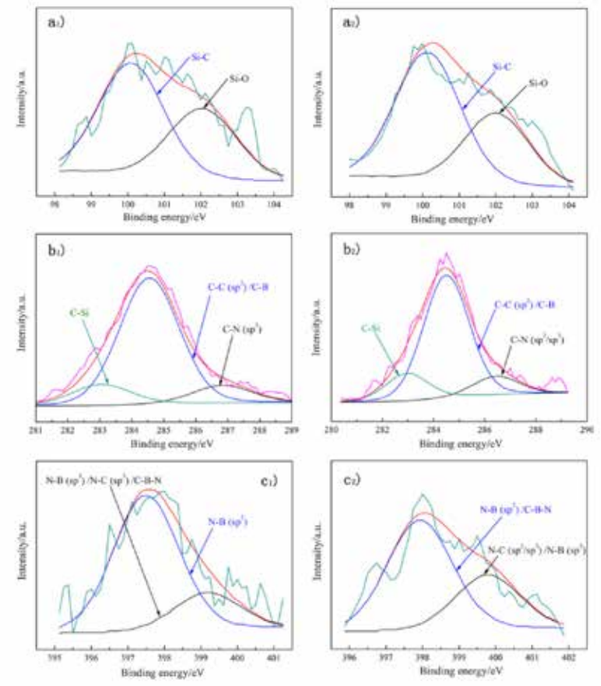


Fig. 3 XPS spectra of (a) Si 2p, (b) C 1s, and (c) N 1s for Si-B-C-N ceramic monoliths sintered at (a1–c1) 1100 °C and (a2–c2) 1600 °C

Advanced structural ceramics and ceramic matrix composites (CMCs) have always been in urgent need in the fields of aerospace, defense, electronics, metallurgy, petrochemicals, nuclear energy and high-end equipment manufacturing. Above all, the requirements of novel multi-functional thermal protective and high-temperature structural ceramics become increasingly harsh in the extreme and complex service environment including (ultra) high temperatures, serious thermal shock, strong erosion and ablation by high-temperature and high-pressure combustion-gas flow, nuclear irradiation and high-temperature oxidation etc. The development of advanced ceramics with excellent properties including light weight, high load-bearing capacity, good resistance to oxidation, thermal shock and ablation, therefore, becomes increasingly

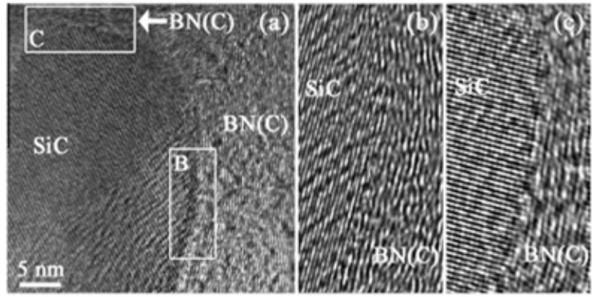


Fig. 4 Microstructural features of the interfacial region between SiC and BN(C) in Si-B-C-N monoliths hot pressed at 1900 °C. (a) HRTEM image of the interfacial region; (b) and (c) the inverse FFT images of the areas marked by the white rectangles B and C in (a), respectively

challenging, and is in need of making a breakthrough as well.

In 2004, the researchers from the team started to explore metastable Si-B-C-N system ceramics expecting these materials to work well in the extreme conditions as noted above. They first proposed and prepared metastable Si-B-C-N ceramics including the highly densified amorphous bulk using an inorganic processing route based on machinal alloying. This method is low-cost, short-production-cycle, eco-friendly, and without the shortage of the organic route which is poor at providing fully dense Si-B-C-N monoliths. The results related to mechanical and thermophysical properties, thermal shock resistance and ablation resistance not only filled the gaps in the field of Si-B-C-N ceramics, but also proved "All roads lead to Rome": the 'hard' inorganic route based on mechanical alloying and 'soft' polymer-derived organic methods provide metastable Si-B-C-N ceramics with similar microstructures and even better properties. Their work on the novel metastable ceramics and CMCs by inorganic method has opened up a new era on the research & development of metastable Si-B-C-N ceramics and CMCs as well as other novel ultra-high temperature ceramics.

The innovative work reported in the review paper includes the amorphization and its mechanisms of inorganic starting powders during the high-energy ball-milling for Si-B-C-N, crystallization mechanisms of amorphous Si-B-C-N powders and monoliths at high temperatures, chemical bonds building and formation and transformation of new phases, microstructural evolution, property development and high-temperature damage mechanisms. Completely amorphous and highly densified Si-B-C-N monoliths were first reported and more than 10 kinds of novel Si-B-C-N ceramics and CMCs were developed. They not only exhibit a good machinability but also show low densities

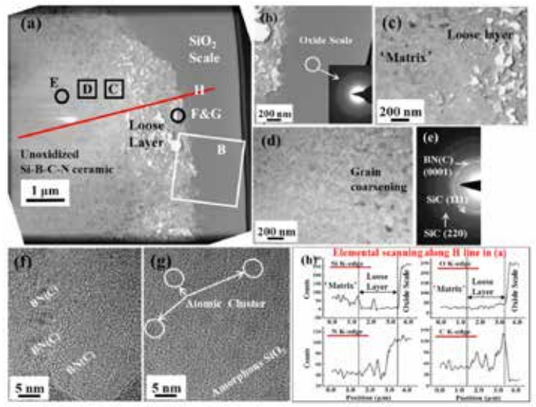


Fig. 5 Microstructure and morphologies of a cross section of amorphous Si-B-C-N ceramic sample prepared by high pressure sintering oxidized at 1700 °C for 8 h. (a) BF image showing the morphologies on the cross section; (b)–(d) BF images at high magnification corresponding to the zones marked by boxes B, C and D in (a), respectively; (e) SAED pattern corresponding to the zones marked by the circle E in (a); (f)-(g) HRTEM images corresponding to the zone marked by the circle F&G in (a); and (h) linear scanning result showing the element distribution along the red line H in (a)

and resistance to high-temperature creep, thermal shock and ablation etc. In return, nozzles resistant to oxidation, used in the eco-friendly, efficient propulsion system of some new type of spacecraft were designed and developed as well as some other thermal protection structural parts. The nozzles based on Si-B-C-N CMCs successfully passed the ground bench test, thus provides powerful support of materials and technologies for the development of new types of eco-friendly, efficient propulsion systems.

The paper was financially supported by the National Natural Science Foundation of China (NSFC) and the National Science Foundation for Distinguished Young Scholars of China.

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NEW STRATEGY TO ACCELERATE LI-ION TRANSPORT BY ENGINEERING 2D NANOFLUIDIC LI-ION TRANSPORT CHANNELS

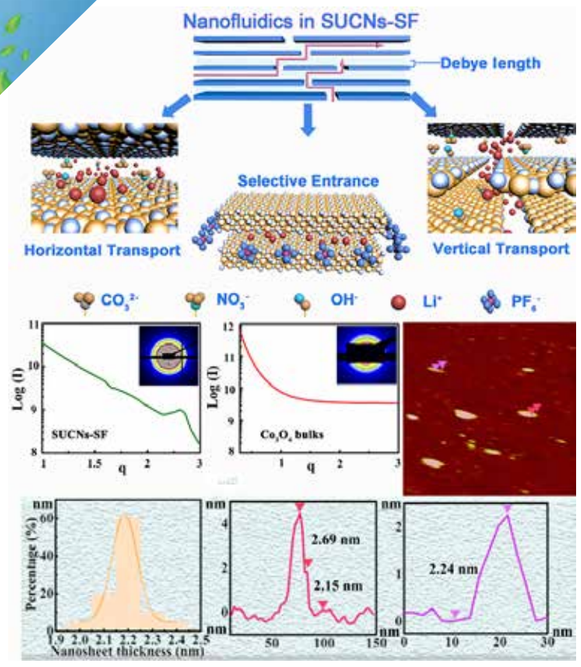
In October 2017, a team led by Professor Chen Gang from the MIIT Key Laboratory of Critical Materials Technology for New Energy Conversion and Storage, School of Chemistry and Chemical Engineering at HIT published a research paper titled "Engineering 2D Nanofiuidic Li-Ion Transport Channels for Superior Electrochemical Energy Storage" in Advanced Materials as a front cover paper. This study provided a rational strategy to enhance the rate performance of electrodes for lithium-ion batteries (LIBs).

Recently, rechargeable LIBs have already dominated the present portable electronics market, and were extended to applications in electric vehicles. Seeking electrode materials with higher capacity has been one of the most significant research focuses. But conventional carbonaceous anodes were approaching theoretical capacity limits and could not meet the ever-increasing demand for even higher energy densities. As one kind of emerging anode materials, transition metal oxides drew a high degree of attention due to their high theoretical capacities. Nevertheless, the practical application of transition metal oxides was greatly restricted by the sluggish kinetics of lithium ion transport and fierce volume expansion during the electrochemical reactions.

Hereof, Professor Chen's team proposed a synergic strategy combining controlled interlayer spacing and surface functionalization by constructing 2D nanofluidic structures that were fitted for LIBs. In principle, a surface charged nanofluidic channel narrower than the Debye length of the electrolyte enabled exclusive transport

of oppositely charged ions. More significantly, ionic conductivity was remarkably promoted in such unipolar ionic transport. Accordingly, properly constructed 2D nanofluidic channels with negative surface charge could realize rapid lithium ion transport. As a proof-of-concept demonstration, stacked ultrathin Co_3O_4 nanosheets with surface functionalization (SUCNs-SF) were provided. The stacked structure established 2D nanofluidic channels which offered extra lithium storage sites, facilitated lithium ion transport, and plenty of buffering space for volume change during electrochemical reactions. When evaluated as anode in lithium ion batteries, SUCNs-SF exhibited standout capacity and excellent long-term cycling stability at high-rates in both half- (375 mAh g^{-1} after 1500 cycles at 5 A g^{-1}) and full-cells (591 mAh g^{-1} after 450 cycles at 1 A g^{-1}). The proposed strategy might pave the way for designing high-power lithium ion batteries.

This research was financially supported by the National Natural Science Foundation of China, China Postdoctoral Science Foundation funded project, and HIT Environment and Ecology Innovation Special Funds.



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Chunshuang Yan, Chade Lv, Yue Zhu, Gang Chen, et al. Engineering 2D nanofluidic Li-ion transport channels for superior electrochemical energy storage. Advanced Materials, 2017, 29: 1703909

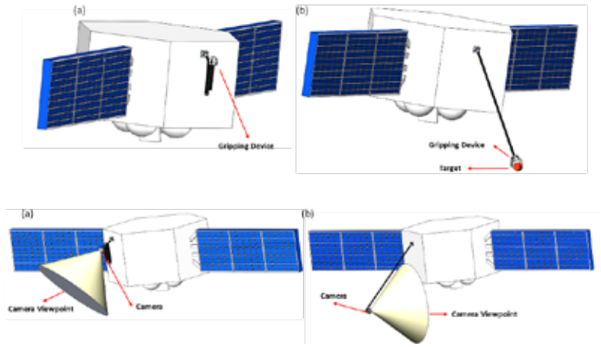
BREAKTHROUGHS IN AEROSPACE APPLICATION FOR INTEGRATIVE SMPC HINGES

Recently, Professor Leng Jinsong's group published a paper titled "Integrative Hinge Based on Shape Memory Polymer Composites: Material, Design, Properties and Application" in the internationally renowned journal Composite Structures. For many years, Professor Leng's group has been conducting systematical studies on shape memory polymer composites (SMPC) in the field of aerospace, and has made important progress in the study of integrative SMPC hinge.

Deployable structures are necessary components in aerospace, navigation, weapon and equipment structure fields. In general, traditional deployable components are quite complicated and lead to serious impact to the whole structure inevitably with relatively heavy shocks and vibrations when deploying. In

order to overcome these problems, intelligent deployable structures based on SMPCs have been adopted to realize the capabilities of structure bearing, self-locking and deployment, showing the features of simple structure, light weight, and low impact.

In this work, a SMPC based hinge, which is structural and functional integration without complex mechanical connections, has been designed and analyzed from the perspective of material, properties and application. The variable elastic modulus of SMPC with temperature has been obtained from tensile tests, providing evidence for simulation of bending property and modal analysis. Results from modal tests demonstrate the significantly improved structural total stiffness of integrative SMPC hinges, due to the higher natural frequencies. Bending



Prospective multi-angle imaging system

behaviors such as strain and stress distributions, received from simulation data and DIC technique, are to evaluate the deformation process of integrated SMPC hinges. The hinges have satisfied shape memory recovery properties. The integrated SMPC hinges can be applied to construct deployable structures for promising applications in aerospace, and two types of structures that are self-driven gripping device and multi-angle imaging system have been described.

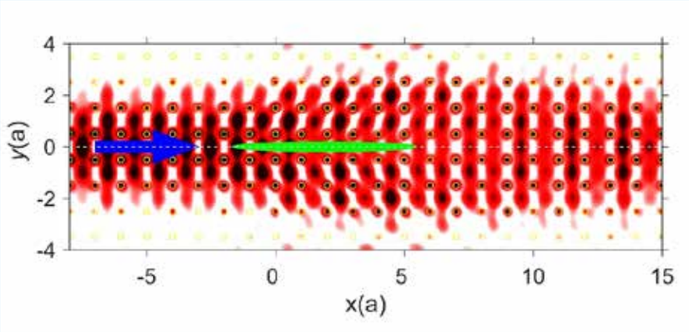
This paper was financially supported by the National Natural Science Foundation of China.

REFERENCE

Tianzhen Liu, Liwu Liu, Miao Yu, Qifeng Li, Chengjun Zeng, Xin Lan, Yanju Liu, Jinsong Leng. Integrative hinge based on shape memory polymer composites: material, design, properties and application. Composite Structures, 2018, 206, 164-176

NEW MECHANISM TO GENERATE OPTICAL PULLING FORCE BY THE BLOCH MODE IN A PHOTONIC LATTICE

In March 2018, a group led by Professor Ding Weiqiang from the Department of Physics at Harbin Institute of Technology published a research paper titled “Self-Induced Backaction Optical Pulling Force” in the journal Physical Review Letters. The study revealed a new mechanism to achieve optical pulling manipulation by the Bloch mode in a periodic photonic lattice, which greatly challenged the traditional understanding of optical pulling.



Top: Scattering of the self-collimation mode by the object.
Bottom left: Optical pulling force versus position x.
Bottom right: Self-induced intensity gradient trapping.

Optical manipulation techniques utilizing optical forces, such as optical tweezers, are the most efficient way to handle objects in micro and nano-scale. Recently, it is found that an object can not only experience a forward radiation pressure, but a backward pulling force is also possible in some critical cases. For this purpose, one of the most important criteria is supposed to be the suppressing of the gradient force component.

Our new findings broke this widely held conception and realized the continuous optical pulling manipulation using the intensity gradient force, while the scattering force is suppressed. The basic principle is the introduction of a periodic photonic lattice, which supports a unique Bloch mode, i.e., the self-collimation mode. When the mode is scattered by the object, significant interaction occurs, and finally the object is trapped in a negative gradient region generated by the object itself. This is the basic reason for this counterintuitive optical pulling force. These findings shed insightful concepts concerning the optical force and momentum physics and technologies.

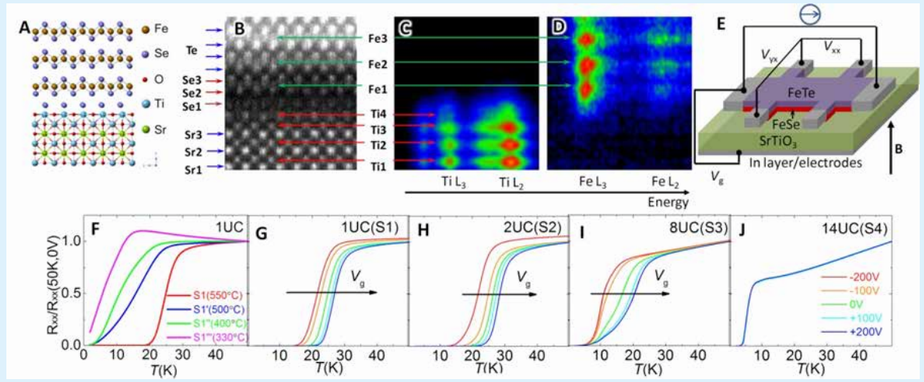
This research was financially supported by the National Natural Science Foundation of China, and the Young Top-Notch Talent Program of HIT. ■

REFERENCE

Tongtong Zhu, Yongyin Cao, Lin Wang, et al. Self-induced backaction optical pulling force. Physical Review Letters, 2018, 120 (12):123901

NEW PROGRESS IN RESEARCH ON MECHANISM OF HIGH TEMPERATURE SUPERCONDUCTIVITY

Professor Zhao Weiwei from Harbin Institute of Technology, Shenzhen collaborated with Professor Moses Chan from Penn State University, Professor J. S. Moodera from MIT, and Professor Yimei Zhu from the Brookhaven National Laboratory to study the mechanism of high temperature superconductivity in the FeSe/STO system. The new progress of this work was published in Science Advances with the title of “Direct Imaging of Electron Transfer and Its Influence on Superconducting Pairing at FeSe/$SrTiO_3$ Interface.”



The superconducting transition temperature of the single layer FeSe grown on the STO substrate was found to be close to the temperature of liquid nitrogen, thus this system has caused great attention in this field. However, the exact mechanism of high superconducting transition temperature of the system is still not clear. By electrical transport, low temperature electron energy-loss spectroscopy (EELS), and high-angle annular dark-field scanning transmission electron microscopy (HAADF-STEM) measurements, Professor Zhao Weiwei and his collaborators found direct evidence for the transfer of electrons from the STO substrate to the FeSe film but also the transferred thickness is limited in two monolayers at the interface. This discovery is of great significance for understanding the mechanism of the high superconducting transition temperature of the FeSe/STO system, and also provides new research ideas for other two-dimensional systems.

This work was supported by China 1000 Talents Program for Young Professionals.

REFERENCE

Weiwei Zhao, Mingda Li, Cuizu Chang, et al. Direct imaging of electron transfer and its influence on superconducting pairing at FeSe/ $SrTiO_3$ interface. Science Advances, 2018, 10.1126

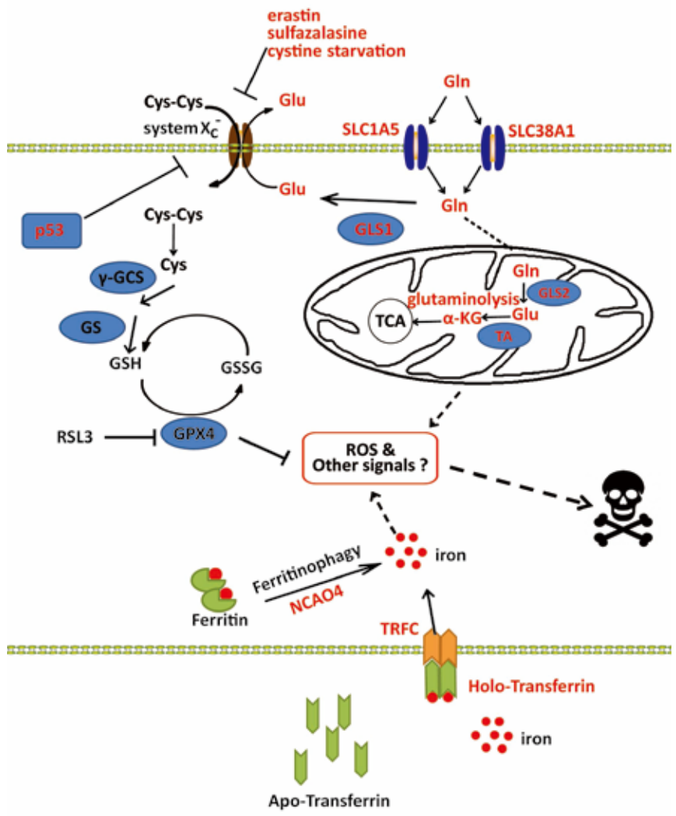
TO EAT OR NOT TO EAT—THE METABOLIC FLAVOR OF FERROPTOSIS

In April, a group led by Dr. Gao Minghui from the Center for Life Sciences and the School of Life Sciences and Technology at HIT published a review paper titled “To Eat or Not to Eat – The Metabolic Flavor of Ferroptosis” in the journal Current Opinion in Cell Biology.

Cell death is an important process in the body as it promotes the removal of unwanted cells. Many diseases are associated with abnormal cell death. For example, cancer can happen when cells fail to die, and

autoimmune disease can happen if cells die when they shouldn't.

Cardivasclararterial disease is the leading cause of death worldwide. Globally, more than 17 million people die from cardivasclararterial disease every year. Genetic and pharmacological manipulations indicate that cell death is an important component in the pathogenesis of cardivasclararterial disease. Ferroptosis is a recently identified iron-dependent, non-apoptotic form of cell death. Pharmacological inhibition of ferroptosis can reduce heart injury triggered by ischemia/reperfusion, suggesting a potential therapeutic approach for treating related diseases. Distinctive from other death mechanisms, ferroptosis requires cellular iron and lipid peroxides, and is dictated by specific cellular metabolic processes. This paper summarized the recent progresses and important questions of the field by focusing on the function of cellular metabolism in ferroptosis. The relevance of ferroptosis to disease and therapy is also discussed.



REFERENCE

M Gao, X Jiang. To eat or not to eat-the metabolic flavor of ferroptosis. Current Opinion in Cell Biology, 2017, 51:58

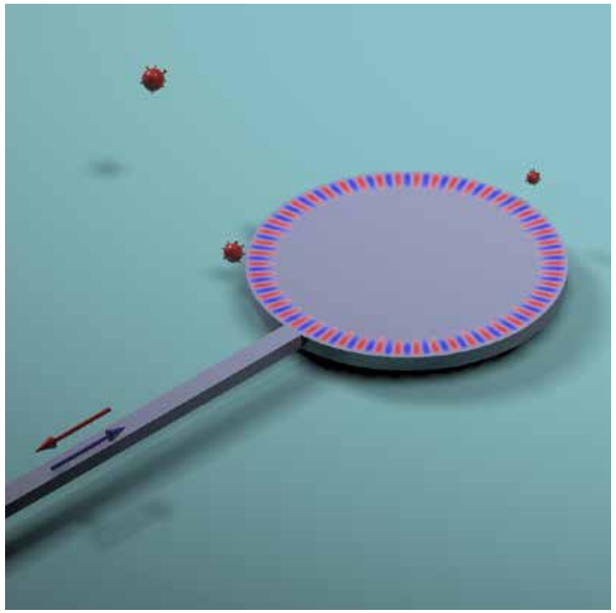
INNOVATIVE LIGHT-DELIVERY TECHNIQUE IMPROVES BIOSENSORS

Early-stage detection of cancer or other diseases is increasingly demanded for medical diagnosis. Among the numerous sensing techniques, whispering-gallery-mode (WGM) resonator based sensors show their obvious advantages in tiny size and high precision. A single cancer cell, protein tissue or even a virus could be precisely measured with these sensors. However, the traditional WGM sensors require nano-scale alignment between the waveguide and the microcavity, which increases manufacturing costs and makes the devices susceptible to stability problems.

To address this obstacle, Professor Song Qinghai and Xiao Shumin's group from HIT Shenzhen published a research paper titled "End-Fire Injection of Guided Light into High-Q Microdisks" in the OSA journal Optica. They developed an innovative way to inject light into a silicon microdisk through the waveguide connected directly. Intuitively, one

may think that light will bounce off the interface due to being nearly perpendicular to the cavity's side. However, they showed that the resonance makes the high coupling efficiency from waveguide to microcavity possible. This process could be understood by its time-reversal process, where resonant mode leaks into the waveguide in unidirectional microcavity laser devices. As this configuration doesn't require any parts that are smaller than 500 nanometers, it could be fabricated with low-cost CMOS techniques. What's more, it also revealed a high fabrication deviation tolerance, significantly reducing the fabrication costs.

This structure demonstrated a high sensitivity to detect single nanoscale objects smaller than 60 nm in diameter. They are keen enough to use cell-derived vesicles that are about 40 to 100 nanometers to detect cancer, which should be viable based on these results. All the performance of this technique is comparable to that of conventional microdisks but with improved robustness and reduced cost, promoting microdisk sensor commercialization. The critical goal of Professors Song and Xiao is to use their end-fire injection technique to create a portable and low-cost sensor chip that can detect variations in cells that are early indicators of cancer. Beyond that, the new light-coupling arrangement could also be beneficial for built-in photonic circuits for communication applications.



The schematic picture of the end-fire injection configuration

This research is highlighted as release news by the OSA official website, Phys.org, Science Daily and other more than 20 media outlets, with the title "Innovative Light-Delivery Technique Improves Biosensors." In addition, Optics & Photonics News reported the research news under the name "Laser Time Reversal for On-Chip Sensors" to introduce this project.■

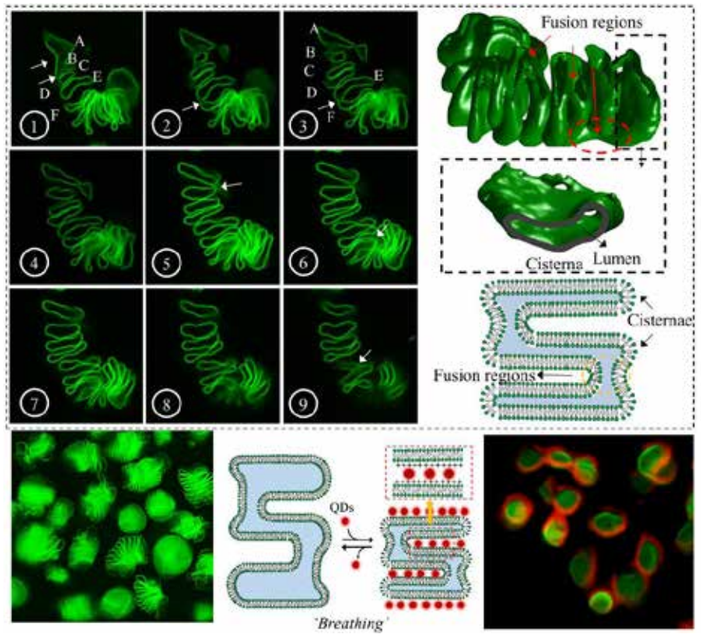
REFERENCE

Shuai Liu, Wenzhao Sun, Yujie Wang, Xiaoyi Yu, Ke Xu, Yongzhen Huang, Shumin Xiao, and Qinghai Song. End-fire injection of light into high-Q silicon microdisks. Optica, 2018, 5, 5, 612-616

BREAKTHROUGHS IN ARTIFICIAL CELLS

A team led by Professor Han Xiaojun from the State Key Laboratory of Urban Water Resource and Environment, in the School of Chemistry and Chemical Engineering published a paper titled "Self-Assembled 'Breathing' Grana-Like Cisternae Stacks" in the high ranking journal Advanced Materials (2018 IF: 21.950). Professor Han is the only corresponding author and both authors are from Harbin Institute of Technology. They made significant progress in the field of artificial cells.

As simplified cell models, artificial cells are important for investigating the structure and function of cells and the molecular interaction mechanism inside the cells, as well as providing clues for life origin. It is well known that the organelles, such as chloroplast grana and endoplasmic reticulum, are composed of cisternae stacks rather than spherical structures. However, it is difficult to fabricate this type of artificial



organelle using phospholipids, since it is unfavorable from the thermodynamic view. In this paper, the researchers demonstrated the formation of grana-like cisternae stacks using phospholipids, which could expand and compress like a spring. After embedding two types of quantum dots inside the artificial grana, fluorescence resonance energy transfer (FRET) was observed between them, which confirmed the light harvesting function of the artificial grana. The novelty and importance of this study were fully recognized by reviewers.

In recent years, Professor Han has made a series of advances in the artificial cell field and has published a series of peer-reviewed papers. He was awarded the New Century Excellent Talents in 2009. So far, he has published 112 peer-reviewed journal papers and has won over 20 grants, including 5 from the National Natural Science Foundation of China.

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

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Qingchuan Li, Xiaojun Han. Self-assembled “breathing” grana-like cisternae stacks. Advanced Materials, 2018, 30(25):1707482

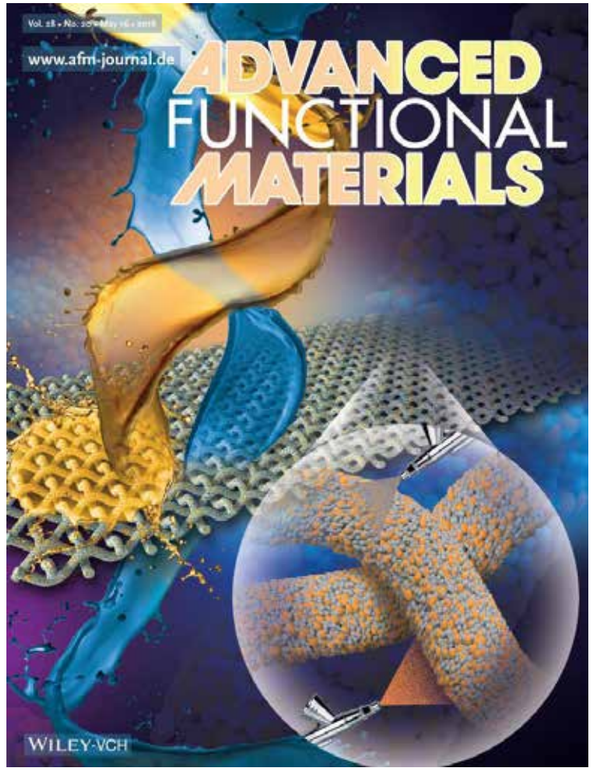
SELECTIVE SUPERWETTABILITY, A NOVEL DEVELOPMENT FOR OIL WATER SEPARATION

Recently, Professor Zhao Xuezeng and Professor Pan Yunlu from the School of Mechatronics Engineering at HIT achieved the latest development in the field of selective wettability, which can be widely applied in oil water separation and controllable liquid transportation. The work was published as the back cover in Advanced Functional Materials.

Oil water separation is significant in various applications, and the separation by a mesh membrane is of interest due to its high efficiency and low energy cost. However, since the surface tension of water is higher than that of oil, the separation method based on mesh was always achieved by “refusing water & passing oil.” Then the meshes were very easily disturbed by the adhesive oil, which limited the applications.

The team broke the limitation of the traditional surface tension theory by creating a special micro-nano structure. They developed a superwetting coating which can completely repel the oil while being completely wetted by water. By applying the developed coating on the mesh subtract, separation of oil and water as “refuse oil & passing water” can be simply achieved, which has significant advantages and applications.

In addition, since the superwetting coatings are always too brittle to be used, the team also developed a ferroconcrete-like structure which substantially increased the mechanical durability of the coating, which is about 10 times better in similar tests than the previous work published in Science in 2015. ■



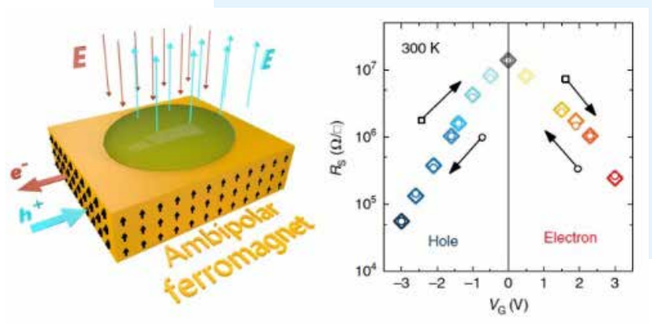
REFERENCE

F Li, Z Wang, S Huang, Y Pan, X Zhao. Flexible, durable, and unconditioned superoleophobic/superhydrophilic surfaces for controllable transport and oil–water separation. Advanced Functional Materials, 2018, 28(20), 1706867

AMBIPOLAR FERROMAGNETISM BY ELECTROSTATIC DOPING OF A MANGANITE

Complex-oxide materials exhibit physical properties that involve the interplay of charge and spin degrees of freedom. However, an ambipolar oxide that is able to exhibit both electrondoped and hole-doped ferromagnetism in same material has proved elusive.

Recently, Professor Lv Weiming’s group in the Condensed Matter Science and Technology Institute, School of Science, cooperating with X. Renshaw Wang from Nanyang Technological University, published a paper titled “Ambipolar Ferromagnetism by Electrostatic Doping of a Manganite” in Nature Communications, which was selected as one of



Schematic of the electric double-layer transistor and transport properties of 3 uc $LaMnO_3$ (LMO) at various gate voltages

the highlighted papers on the journal's homepage.

This work reported the ambipolar ferromagnetism in $LaMnO_3$, with electron–hole asymmetry of the ferromagnetic order. Starting from an undoped atomically thin $LaMnO_3$ film, researchers electrostatically dope the material with electrons or holes according to the polarity of a voltage applied across an ionic liquid gate. Magnetotransport characterization reveals an increase of either electrondoped or hole-doping induced ferromagnetic order in this antiferromagnetic compound and leads to an insulator-to-metal transition with colossal magnetoresistance showing electron–hole asymmetry. These findings are supported by density functional theory calculations, showing that strengthening of the inter-plane ferromagnetic exchange interaction is the origin of the ambipolar ferromagnetism.

The result raises the prospect of exploiting ambipolar magnetic functionality in strongly correlated electron systems. Electric control of the charge of spin-polarized carriers offers an opportunity for future bipolar magnetic technology in strongly correlated electron systems. ■

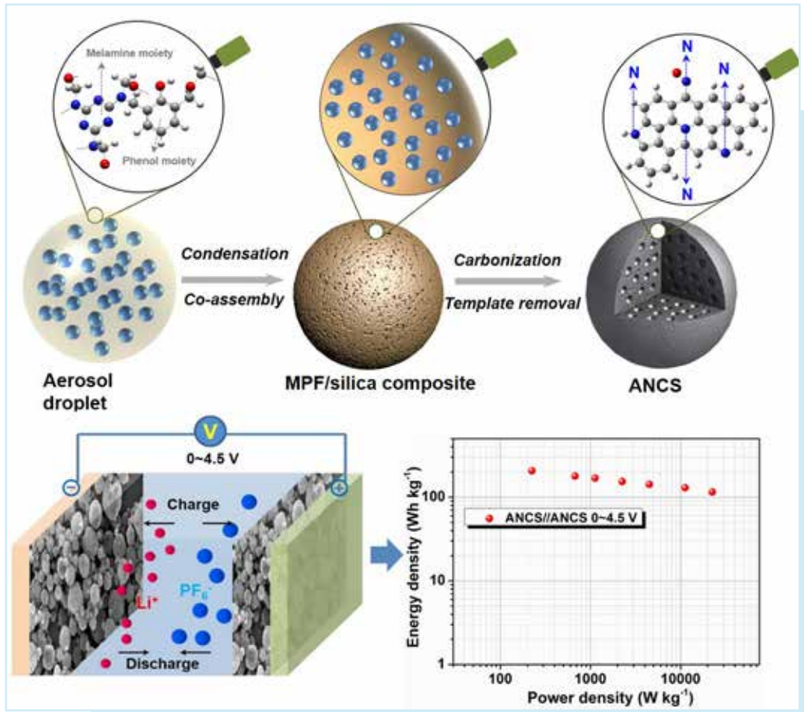
REFERENCE

LM Zheng, XR Wang, WM Lü, CJ Li, TR Paudel, et al. Ambipolar ferromagnetism by electrostatic doping of a manganite. Nature Communications, 2018, 9:1897

BREAKTHROUGHS IN CARBON-BASED ELECTROCHEMICAL ENERGY STORAGE MATERIALS

On April 30, a team led by Professor Gao Jihui from the School of Energy Science and Engineering at Harbin Institute of Technology published a research paper titled "In Situ High-Level Nitrogen Doping into Carbon Nanospheres and Boosting of Capacitive Charge Storage in Both Anode and Cathode for a High-Energy 4.5 V Full-Carbon Lithium-Ion Capacitor" in Nano Letters, a prestigious journal in the nano-research area. Associate Professor Sun Fei is the first author.

Lithium-ion batteries (LIBs) and supercapacitors (SCs) have been widely applied in laptop computers, mobile phones, electric vehicles, and elevators, but they still have shortcomings, such as low power densities and short cycling life for LIBs and low energy densities for SCs. Lithium-ion capacitors (LICs), which integrate a lithium storage anode and a capacitor-type cathode, show potential to overcome these shortcomings. However, the dissimilar cathodes and anodes used in LICs make it difficult to achieve the synergetic improvements in energy density, power density and cycling stability.



To circumvent the electrochemical kinetics, stability and capacity discrepancies between capacitor-type cathodes and battery-type anodes, Professor Gao Jihui's team synthesized high-level nitrogen-doping mesoporous carbon spheres by a continuous aerosol-spaying process. Using both anode and cathode materials, such carbon spheres circumvent the electrochemical discrepancies between Li^+ storage anode and PF^{6-} storage cathode due to the high-level doping of nitrogen atoms inducing more rapidly capacitive charge-storage contributions for both electrodes.

This research shows the development potential and application prospects of high-voltage full-carbon LICs and provides insights into the design of high-performance lithium ion capacitors by the regulation of the chemical environment of carbon nanomaterials.

This work was financially supported by the National Natural Science Foundation of China, HIT Discipline Construction Funds and the Fundamental Research Funds for Central Universities.

REFERENCE

Fei Sun, Xiaoyan Liu, Hao Bin Wu, Lijie Wang, Jihui Gao, Hexing Li, and Yunfeng Lu. In situ high-level nitrogen doping into carbon nanospheres and boosting of capacitive charge storage in both anode and cathode for a high-energy 4.5 V full-carbon lithium-ion capacitor. Nano Letters, 2018, 18 (6): 3368-3376

HIGH QUALITY SEM IMAGING OF SUPPORTED GRAPHENE MADE EASY

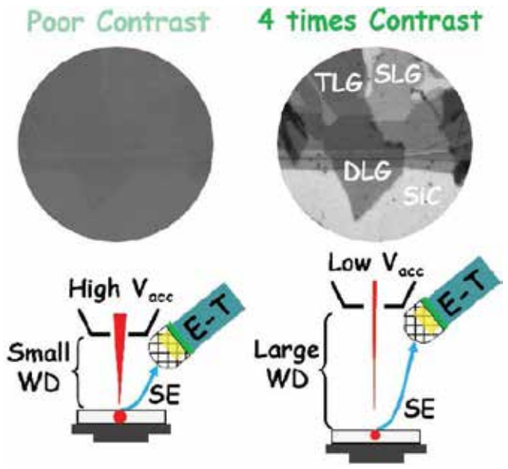
Accurate and fast characterization of atomically thick graphene has always been much desired since the discovery of graphene. The properties and performance of graphene or graphene devices depend sensitively on various geometrical and structural characteristics, such as dimensions, defects (ruptures/folds/voids/wrinkles), as well as contaminations, etc. With more than a decade of intensive investigations, with the opportunity for large-scale applications of graphene on the horizon, sectors of academics and industry are becoming even more eager for new developments in accurate and fast characterization approaches.

SEM, as a non-invasive imaging technique, offers nanoscale spatial resolution, quick setup, and wafer-scale surveying capability compared with optical microscopy, Raman microscopy, AFM, and TEM. However, it is unfortunate that high contrast SEM imaging of supported graphene has yet to be fully exploited for accurate and effective differentiation between graphene and substrates and between distinct graphene layers, as well as clearly resolving fine features like wrinkles. This unfortunate overlook is certainly not profitable for fully exploiting the potential of SEM in characterizing graphene.

In their latest paper published in Small, Professor Gan Yang's group (School of Chemistry and Chemical Engineering) reported that for both G/SiC and G/SiO_2/Si systems, the markedly improved SE image contrast (as high as five times) is feasibly realized by tuning V_{acc} and WD with the side-attached E-T SE detector, which is the standard and most popular detector for every SEM. Traditionally, it has been considered more challenging to realize good image contrast for supported graphene with this detector. Furthermore, revealing the overlooked effect of WD immediately demonstrates a facile strategy for more effective SEM characterization of graphene and other 2D materials.

This work also theoretically contributed to the conceptual development of a unified model of V_{acc} and WD dependence of SE collected by the E-T SE detector. This model, though being semi-quantitative, nevertheless, put the mechanistic study of SEM imaging of graphene in a rational and solid foundation, which has been considerably lacking in the current literature.

The impact and significance of this work thus not only lie in advancing the effective SEM characterization of graphene, but also give much-needed incentive for rethinking our conventional SEM imaging habits for 2D materials. ■



REFERENCE

Li Huang, et al. High-contrast SEM imaging of supported few-layer graphene for differentiating distinct layers and resolving fine features: there is plenty of room at the bottom. Small, 2018, 1704190

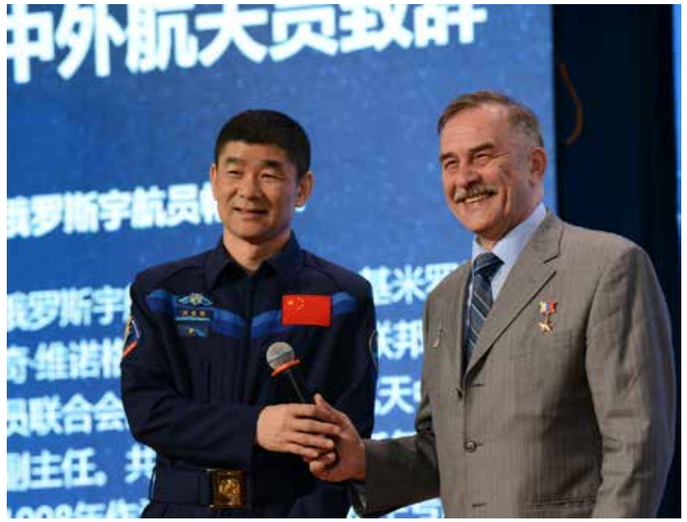
NEWS & EVENTS

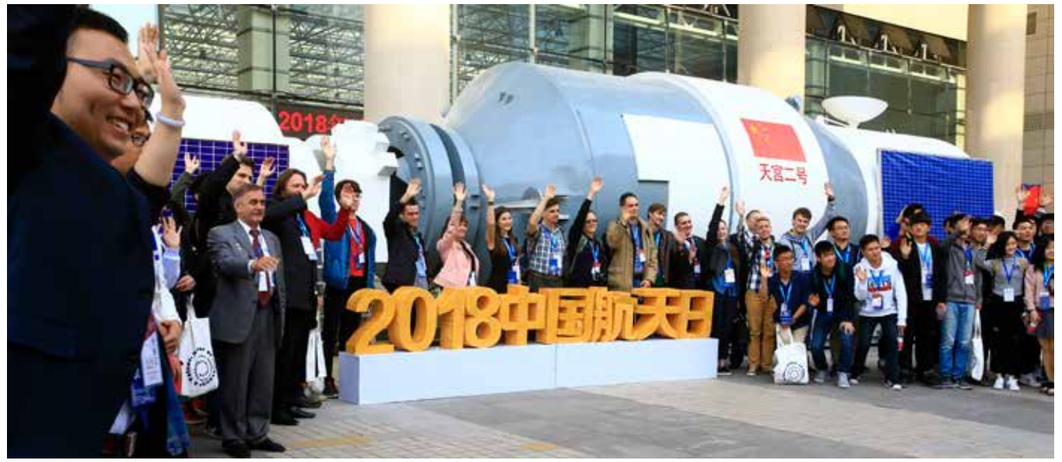
CHINA SPACE DAY 2018

On April 24th, the opening ceremony of the third China Space Day with the theme of "Forging Together New Era of Space Development" was held at Harbin Institute of Technology. HIT Party Secretary Wang Shuquan, HIT President Zhou Yu and the leaders from the Ministry of Industry and Information Technology, the State Administration of Science and Heilongjiang Provincial Government attended the ceremony.

During the ceremony, the Chang'e-4 TDRSS and two small satellites developed by HIT were named "Magpie Bridge," "Longjiang-1" and "Longjiang-2" respectively. Planned to be launched by the end of 2018, Chang'e-4 will land on the far side of the moon for the first time. Chang'e-4 TDRSS is planned for launch in May providing ground-satellite communication support, while the two small satellites will realize a rounding formation flying in orbit around the moon conducting ultra-long wave astronomical observation.

After the ceremony, the first China Commercial Space Summit was held. The Summit is sponsored by the Chinese Society of Astronautics, co-hosted by the Beijing Future AeroSpace Space Technology Institute and Harbin Institute of Technology, and was supervised by the State Ministry of Industry and Information Technology and the People's Government of Heilongjiang Province. Under the theme of "Exploring Future Aerospace Technology and Developing the Commercial Space Industry," the summit facilitated discussion and dialogue on the integration and cooperation of domestic and foreign advanced technology as well as the future commercialization prospects of commercial space industry, which will promote the commercial space industry to better serve the economic construction and human life. The summit was composed of several activities such as a master forum and different sub-forums, exhibitions and a venture road show. More than 2000 leading figures from governments, scientific research institutions, enterprises, investment institutions, the technical community and civil societies all around the world participated in the event.





The summit was a platform for international cooperation in the commercial space community, promoting worldwide respect for diversity, focusing on mutual development, forging consensus and boosting innovation. It is our hope that more enterprises will join us in sharing the opportunities and outcomes brought along by the development of the commercial space industry by shaping a better future of human society in the new aerospace era.

On the same day, a series of activities were held to celebrate the China Space Day, such as a flag raising ceremony, art performances, faculty hiking, the “Sailing Cup" knowledge contest, an essay contest with the theme of “Feelings of Space,” a poetry exchange which offered tribute to careers in space, etc.

Chinese President Xi Jinping said, “Exploring the vast universe, developing space programs and becoming an aerospace power has always been the dream we strive for.” In the new era of space development, as China's space infrastructure continues to improve, deep-space exploration will reach farther. People will feel closer to space science and technology through its extensive application. ■

HIT VICE PRESIDENT REN NANQI VISITED ISRAELI UNIVERSITIES

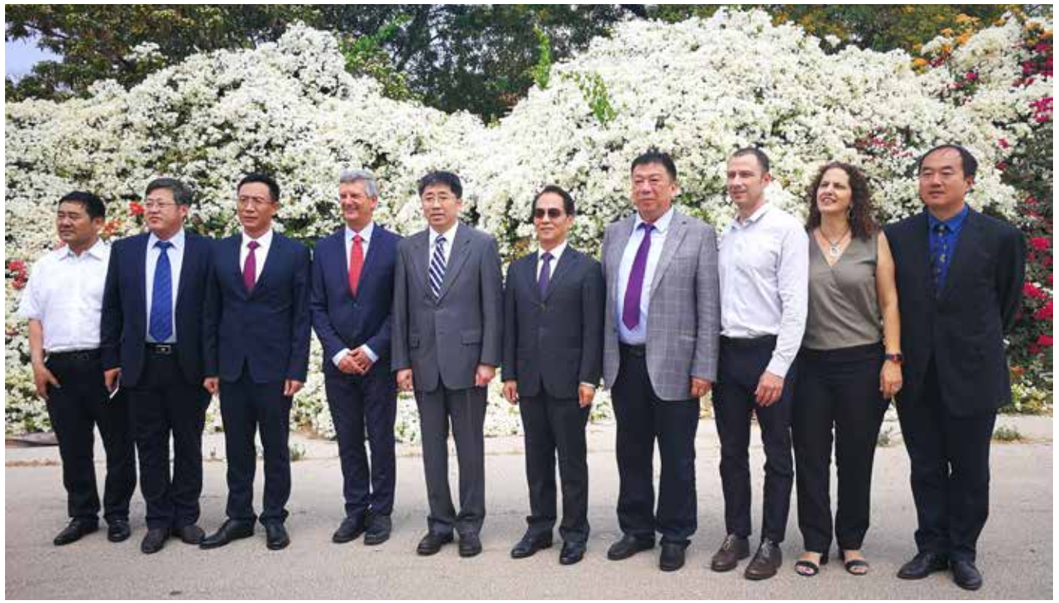
From June 2nd to 5th, HIT Vice President Ren Nanqi led a delegation to visit the Hebrew University of Jerusalem, the Israel Institute of Technology and Tel Aviv University. They also visited the Chinese Embassy in Israel, the Association of Former Residents of China in Israel, Israel Aerospace Industries Ltd., and the Mitrelli Group. During the visit Vice President Ren signed cooperation agreements with the Hebrew University of Jerusalem and the Israeli Institute of Technology.

During the visit, the HIT delegation met with vice presidents and related leaders from the Hebrew University of Jerusalem, the Israel Institute of Technology and Tel Aviv University. The delegation promoted the latest achievements in HIT’s development and construction, international cooperation and exchanges, and major scientific research platforms. They discussed the possibility of cooperation among the universities in the areas of interscholastic research

cooperation and innovation, the establishment of superior disciplines, the exchange of teachers and students, and joint training of talents. On behalf of Harbin Institute of Technology, Vice President Ren signed cooperation agreements with the Hebrew University of Jerusalem and the Israel Institute of Technology respectively.

Vice President Ren paid an official call on the Charge d'Affaires of the Chinese Embassy in Israel, Cai Weiming, and gave an informative report regarding HIT's latest achievements in development. The delegation had a meeting with Joseph Zarzewsky, Vice President of Business Development at the Mitrelli Group, discussing cooperation projects in industrial technology transformation and related fields. After meeting with Executive Vice President Moseh Medina and

some aviation experts, they visited Israel Aerospace Industries, Ltd. and its aircraft production line. At the Association of Former Residents of China in Israel, the delegation held talks with President Yossi Klein and representatives of Israeli children who had lived in Harbin, promoting exchanges and cooperation in the fields of education and culture.



HIT VICE PRESIDENT DING XUEMEI ATTENDED SYMPOSIUM OF C9+1 UNIVERSITIES 2018

From April 12th to 14th, the Symposium of C9+1 Universities in China was held at the University of Hong Kong (HKU). The theme this year was "Innovation and Excellence in Teaching and Learning in Research Intensive Universities in China." The Chief Executive Mrs. Carrie Lam Cheng Yuet-ngor and China's Minister of Education Mr. Chen Baosheng officiated at the event.

HIT Vice President Ding Xuemei attended the symposium and made a keynote speech titled "The Reform of Harbin Institute of Technology (HIT) in Cultivating Adaptable and Leading Talents." She introduced HIT's education concept of "student-centered and effective driving of learning and development." The cultivation model consisted of three parts: "core-values cultivation," "development of comprehensive abilities" and "multidimensional knowledge exploration." She also shared the practice and experience of discipline setting and the education of innovation practices.

The C9 League was formed in 2009 by nine key universities of the national 985 Project on the Mainland, namely, Fudan University,

Harbin Institute of Technology, Nanjing University, Peking University, Shanghai Jiao Tong University, Tsinghua University, University of Science and Technology of China, Xi'an Jiao Tong University and Zhejiang University. The first C9+1 symposium was held at HKU in 2010. Since then, HKU has been establishing significant relationships with the individual universities of the C9 League. Today, the institutions are committed to making the Teaching and Learning Symposium an annual event and planning to host it in turn. Since The Symposium is an opportunity for the universities to encourage engagement with stakeholders at all levels, including senior management, teachers and students to discuss innovation and excellence in teaching and learning.

HIT VICE PRESIDENT XU DIANGUO ATTENDED WORLD UNIVERSITY PRESIDENTS SYMPOSIUM & BEIJING FORUM 2018

From May 4th to 5th, the World University Presidents Symposium & Beijing Forum 2018 was held at the Diaoyutai State Guesthouse in Beijing. HIT Vice President Xu Dianguo attended the symposium and made a keynote speech at the panel session.

During the speech, he demonstrated 3 aspects regarding the actual situation of HIT. As for the external dimension, we should manage the relationship with the government and society and create a good external and academic innovation environment. Regarding the internal dimension, we should seize the principle contradiction of university development and constantly improve the internal governance structure. In addition, we should insist on strictly managing the campus by laws and improving the guarantee mechanism of the management system.

This year the Beijing Forum, an annual academic event initiated in 2004, is combined with the World University Presidents Symposium as part of Peking University's 120th anniversary. Nearly 800 attendees and participants, including university presidents, scholars, and researchers from a total of 261 universities and other institutions from 44 countries and regions gathered in Beijing, China. With the theme of "Changes and Constants: Universities and Civilizations During the Past 120 Years," the symposium serves as a platform for discussing the development of universities, the reform of higher education, and the future of world civilization against a backdrop of globalization and modernization. Scheduled from May 4 to May 5, the Symposium and Forum consisted of 9 panel sessions with three sub-themes: Ecology of Civilizations, Global Governance, and the Mission of the University.

HIT INTERNATIONAL CULTURE CARNIVAL 2018

On June 2nd, the 4th HIT International Culture Carnival was held. HIT Party Secretary Wang Shuquan, HIT Vice President Ding Xuemei and the Executive Director of the US CET Project attended the opening ceremony and beat the gong to start the carnival.

Wonderful shows prepared by students from different countries were performed on the main stage in front of the library. Performers interacted with the audience winning cheers and applause. The cultural exhibition booths were lined along the pedestrian street showing representative products, foods and activities from the various cultures. There were also some Chinese activities such as Chinese calligraphy, a Chinese tea ceremony, and Chinese zither performances, in addition to a host of excellent cultural performances including dance, food, songs and games. This attracted many visitors to our campus to experience different cultures from around the world. Since this year is the 30th anniversary of the United States CET Harbin Project, HIT also held HIT Week, an activity designed for students to experience life at HIT.

HARBIN INSTITUTE OF TECHNOLOGY
NEWSLETTER 2018 ISSUE 1

HIT TIMES

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