



Science and Technology Daily

VOL.1-NO.24

THURSDAY, DECEMBER 16, 2021

WEEKLY EDITION

Solid Implementation of Sci-tech Policies to Be Reinforced in 2022

By Staff Reporters

China will firmly advance the implementation of policies related to science and technology in 2022, according to a statement released on December 10 after the annual Central Economic Work Conference held in Beijing.

According to the meeting, the country will carry out a three-year action plan on the reform of sci-tech management system, and formulate and implement a 10-year plan for basic research.

Sui Jigang, researcher at the Institutes of Science and Development, Chinese Academy of Sciences, said that China aims to create a good environment for sci-tech innovation by emphasizing the reform of sci-tech management system, which reflects the country's further implementation of the innovation-driven development strategy.

The statement called for efforts to enhance China's strategic sci-tech strength, give full play to the role of national laboratories, reconstruct key national laboratories, and promote the reform of research institutes.

It also pledged to strengthen the

principal position of enterprise innovation, and deepen collaboration among firms, universities and research institutes.

The principal position of enterprise innovation is yet to be improved, noted Long Haibo, researcher at the Development Research Center of the State Council. Enterprises' investment in basic research is still relatively low, and small and medium-sized enterprises invest less in sci-tech research than large ones. Long thought that solving the above problems can bring great benefits to the high-quality development of the economy.

More national major sci-tech projects can be organized and implemented by key enterprises, said Chen Jin, professor at Tsinghua University. He suggested that leading enterprises in the sci-tech industry can drive universities and research institutes on tackling key technological problems.

Efforts should also be made to improve the ecosystem for sci-tech innovation, foster a down-to-earth work style, and continue to facilitate international sci-tech cooperation, according to the statement.

Green Olympics

Repurposing of Olympic Venues to Fulfill Sustainability

Edited by TANG Zhexiao

With Beijing being the first city to host both Summer and Winter Olympic Games, several venues of the 2008 Summer Olympics will be reused for the 2022 Winter Olympics as part of the sustainability plan of the Beijing Organizing Committee for the Olympic Games.

Eight venues constructed for the Beijing 2008 Summer Games have been revamped for the Winter Olympics, aiming to save space and reduce unnecessary waste from demolishing and building new structures.

The National Aquatics Centre, known as the Water Cube, has been transformed into the "Ice Cube" after adding a movable and transferable ice rink for the curling competition. It will become the first venue to achieve such an "ice-water conversion."

After the Winter Olympics, the Water Cube will continue to be used for both winter and summer sports, switch-

ing between the two depending on the season.

The most unique venue for the Winter Olympics is Big Air Shougang, which has been built on a former steel mill site, set against the backdrop of four industrial cooling towers.

It is the world's first permanent venue for Big Air, and will stage the freestyle skiing and snowboard Big Air competitions at the Games. The venue will be used for various sports competitions and athlete training, as well as cultural and civic events following the Winter Olympics.

All the new venues use optimized construction materials and meet the three-star standard of green building. Supported by scholars in architecture and ecological preservation, a set of green evaluation standards have been developed to monitor and guide the construction and renovation of all snow sports venues. This is the first evaluation standard for green snow sports venues both domestically and internationally.



The National Aquatics Centre, known as the Water Cube, has been transformed into the "Ice Cube." (Graphic Design: TANG Zhexiao; PHOTO: VCG)



Students watching science experiment demonstrated by the Shenzhou-13 crew members, at the China Science and Technology Museum in Beijing, Dec. 9, 2021. (PHOTO: XINHUA)

Editor's Pick

Special Lecture from Outer Space Enlightens Youth

By WANG Xiaoxia

Eight years ago, Chinese female astronaut Wang Yaping, assisted by the other two crew members aboard the Shenzhou-10 spacecraft, delivered the world's first lecture from space. More than 60 million schoolchildren attended the first "space class."

Wang's lecture had planted seeds of space exploration in the young minds of the students, sparked their curiosity and imagination, and encouraged them to become increasingly more involved in scientific research.

Eight years later, on December 9 this year, Wang again gave a lecture aboard China's space station via live video streaming, with other two crew members of Shenzhou-13, Zhai Zhigang and Ye Guangfu. It is the first time that a lecture was delivered from China's space station.

Inspirational education

The education on Earth and Space

Sciences is an integral part of the world's manned space activities. In August 2007, American astronaut Barbara Morgan delivered the world's first space lecture aboard the International Space Station.

At that time, Morgan shared almost all aspects of her daily life in space, while China's space lectures introduce and demonstrate physical concepts in the microgravity environment, said Pang Zhihao, national chief science communication expert of space exploration technology. In order for Wang to appear on the classroom screen, many technical difficulties had to be tackled so as to successfully deliver the lecture.

Experiments were carefully designed and all the specially made materials and tools used during the experiments had to be safe, in case of harming the astronauts' health or polluting the space station environment.

In addition, astronauts had to move carefully during the class to avoid im-

pacting the safety of space station from floating equipment and liquid.

At the same time, the performance of China's measurement and control communication system had been greatly improved. Relying on the broadband provided by the Tianlian relay satellites, HD videos could be more smoothly transmitted to Earth, said Yang Yuguang, researcher of China Aerospace Science and Industry Corporation.

Unique lecture

Different from the lecture in 2013, the core module of the Tiangong space station has enough space to demonstrate experiments and life in space.

The astronauts showed their bedrooms, kitchen and restroom, and displayed how they exercise, warm food and drink water in the space station. They also demonstrated projects like cytological experiments, the motion of objects and the surface tension of liquids in the microgravity environment. *See page 2*

Sci-tech Innovation: Backbone of China's Economy

By Staff Reporters

Today, economic power is a central pillar of comprehensive national strength, while the foundation of economic development is innovation.

China is ranked the 12th most innovative economy in 2021, moving up the list for nine consecutive years from the 34th place in 2012, according to the *Global Innovation Index 2021* report, released by the World Intellectual Property Organization.

The innovative achievements by enterprises have had a large part to play in China's climbing up the list.

Small and medium-sized enterprises (SMEs) account for 99 percent of all enterprises in China, making them an important factor in the success of

China's economy.

By August 2021, there were 4,762 SMEs called "little giants" that focus on specialization, refinement, differentiation and innovation in micro-segmentation. It contributes to the high-quality development of the country's economy through supporting and cultivating these SMEs.

The high-tech manufacturing industry plays its part as well. The percentage of high-tech manufacturing's added value in that of industrial enterprises above designated size rose from 9.4 percent in 2012 to 15.1 percent in 2020.

China has also been promoting the integration of the real economy with its high-tech industry, like the Internet, big data and artificial intelligence, with more than one million 5G base stations

built and over 1,800 5G+ industrial Internet projects under construction.

In addition, the country's innovation achievements are represented by key projects in the sci-tech sector. With a comprehensive transportation network of more than six million kilometers, China has built the world's largest high-speed railway and expressway networks. Other projects include Beijing Daxing International Airport, Baihetan hydropower station and the Five-hundred-meter Aperture Spherical radio Telescope (FAST).

China has made the real economy and sci-tech innovation its economic backbone, creating value out of concrete work and laying a solid foundation for the transformation from a large economy to a powerful economy.

China-Africa Cooperation Deepens

By Staff Reporters

Before the the Eighth Ministerial Conference of the Forum on China-Africa Cooperation (FOCAC) held on November 29 to 30, China released a white paper on China-Africa cooperation, detailing fruitful results of years. Now the two sides' cooperation in combating COVID-19, poverty and development of emerging fields becomes eye-catching.

When the pandemic hit the world, China rushed to aid Africa. It has provided 120 batches of testing reagents, protective clothing, masks, medical isolation goggles, ventilators and other emergency supplies to 53 African countries and the African Union, and sent anti-epidemic medical experts to 17 African countries since 2020.

China is going to provide another one billion doses of vaccines to Africa, including 600 million doses as a donation and 400 million doses to be provided through such means as joint production by Chinese enterprises and relevant African countries, according to Foreign Minister Wang Yi. *See page 3*

WEEKLY REVIEW

China-Africa Innovation Cooperation Conference Held in Hubei

The 2021 China-Africa Innovation Cooperation Conference opened on December 12 in Wuhan, capital of Central China's Hubei province. A series of activities were held, including a forum, an exhibition of innovation cooperation results, and an innovation and entrepreneurship salon of African young talents.

Long March Carrier Rocket Series Complete 400th Mission

A Long March-4B rocket successfully sent a group of satellites into space from the Jiuquan Satellite Launch Center in northwest China on December 10, marking the 400th launch mission of the China-developed Long March carrier rocket series.

China-led ISO Standard for Marine Survey Released

The *Marine environment impact assessment (MEIA) — Specification for marine sediments in seabed areas — Survey of interstitial biota* was released by ISO on December 10. This is the first ISO international standard concerning marine survey whose formulation was led by China.

China Approves First Medical Treatment for COVID-19

China's medical products regulator announced on December 8 that it had approved the first neutralizing antibody therapy for COVID-19 for emergency use. The product is developed by Tsinghua University, Third People's Hospital of Shenzhen and Bii Biosciences.

WECHAT ACCOUNT E-PAPER



National High-tech Zones Premier Growth Nodes

By Staff Reporters

With more than 30 years of development, reform and innovation, China's national high-tech zones have made significant contributions to the rapid growth of the country's economy.

Statistics from the Torch High Technology Industry Development Center (Torch Center) of the Ministry of Science and Technology, showed that during the past three quarters the overall GDP of 169 national high-tech zones topped 10.2 trillion RMB, accounting for roughly 12.4 percent of the national volume. Likewise, total operating revenues reached 33.9 trillion RMB, signaling an increase of 20.3 percent year-on-year. Enterprises' operating with a profit margin rose by 0.9 percentage point to 7.9 percent year-on-year.

"The macroeconomy of national high-tech zones has maintained a steady

growth," said Jia Jingdun, director of the Torch Center, adding that during the 13th Five-Year-Plan period, the national high-tech zones had become an important engine to boost the national economy.

For example, from January to August this year, the Wuhan East Lake High-tech Development Zone reported 125.5 billion RMB of industrial value from its optoelectronic information enterprises above the designated size, representing a 40.2 percent year-on-year increase. Its high-end equipment manufacturing enterprises above designated sizes registered 26.1 billion RMB of industrial value, increasing by 21.3 percent year-on-year.

Meanwhile, during the same period, Beijing's Zhongguancun Science Park reported 996.7 billion RMB of technology-related revenues and 592.6 billion RMB in new products' sales revenue, increasing 26.3 percent and 96 percent year-on-year respectively. Together, the two revenue streams account for one-third of the park's total volume, meaning its revenue structure is continuously improving. What's more, enterprises also reported a 10.5 percent profit margin, which is the highest in five years.

"China's national high-tech zones have nourished a batch of sci-tech enterprises and industries of international competitiveness," said Jia, emphasizing that these zones have become hubs for innovation in terms of R&D investment and patent output.

Taking up half of Chinese enterprises' R&D investment total, national high-tech zones have cultivated 36.4 percent of the country's high-tech enterprises, more than one-third of small and medium-sized tech enterprises, and 67 percent of the enterprises listed on the sci-tech innovation board.

Statistics from the Torch Center revealed that in 2020, operating revenues of high-tech zones in Beijing's Zhongguancun, Shanghai's Zhangjiang and Wuhan's East Lake as well as Shenzhen, all exceeded one trillion RMB. The GDP of national high-tech zones in Shenzhen and Xi'an both accounted for more than 20 percent of each city, setting the stage for continued high-quality development in the regions.

In July 2020, China decided to transform national high-tech zones into demonstration zones that facilitate innovation-driven development and pilot areas for high-quality development. To make that happen, the Torch Center has introduced an evaluation system that encourages sci-tech innovators to cluster together in the zones. It has also conducted a series of surveys with an eye towards drafting more preferential policies for enterprises.



Qingdao National High-tech Industrial Development Zone (PHOTO: VCG)

Jiangsu: Vision Met and Dreams Built Together

New Jiangsu Reaches out to Global Sci-tech Talent

Jiangsu province is a competitive and appealing destination for innovation and business startups. As far back as the Northern Song Dynasty (960-1127), renowned polymath Su Song decided to spend more than 10 years in Jiangsu's Zhenjiang city. Similarly, Hua Luogeng, the father of modern Chinese mathematics, was a native of Jiangsu's Changzhou city.

Today, more than 400 academicians with the Chinese Academy of Sciences and the Chinese Academy of Engineering call Jiangsu home. Jiangsu is now inviting talented people from all over the world to meet in the province, and help build a better economy to improve the quality of life and environment.

Fighting cancer in Changzhou

"The Jiangsu Friendship Award is one of the most honorable awards I've ever received," said Glynn Jonathan Addison, a British expert on cancer drug research and development, who joined the Changzhou Fangyuan Pharmaceutical Co. Ltd in 2014. Since then, he and his team have developed new types of cancer medicine that are low in toxins and highly efficient, earning some 20 patents and all but revolutionizing the field of

cancer treatment throughout the world.

The Jiangsu Friendship Award is the highest accolade given by the Jiangsu Provincial People's Government to recognize foreign experts who have made outstanding contributions to the province's social and economic development. In 2019, Addison was invited to attend a reception for foreign experts marking the 70th anniversary of the founding of the People's Republic of China. Addison met his Chinese wife in Jiangsu and the couple now have a son. With its diverse cuisine, hospitable residents and convenient lifestyle, Addison found life in Jiangsu to be comfortable, and he is keen to make his own contributions to the development of his adopted province.

Devoted to education

Professor Josef Voglmeir and his Chinese colleagues co-founded the Glycomics and Glycan Bioengineering Research Center (GGBC) at Nanjing Agricultural University, which serves as a launchpad for new research into areas such as food glycomics. To date, the center has published more than 40 SCI theses and obtained dozens of patents, significantly improving the university's research capacity in sugar science. In

2019, he was presented with the Jiangsu International Science and Technology Cooperation Award. "My students in the GGBC are probably one of the most international communities in China," said Voglmeir, citing four European scholars who were conducting post-doctoral research at the center and more than 40 postgraduate students who had received training there.

Facing challenges together

Foreign sci-tech personnel also choose to start their businesses in Jiangsu. In May 2015, Xue Jiuzhi and his team arrived in Jiangsu from the United States and subsequently founded the Smart Liquid Crystal Technologies Co. Ltd. Moreover, Xue was the first project manager with the Jiangsu Industrial Technology Research Institute (JITRI).

The project manager role was one of JITRI's reform measures to bring in global talent. It enabled the institute to select top candidates for project manager positions, allowing them to set up teams, recommend quality endeavors, tackle critical technological challenges and promote the transformation and industrialization of technological achievements.

Thanks to Xue's efforts, a group of

world-class experts have gathered at the institute and conducted research and development on intelligent liquid crystal technology, as well as its application in the fields of architecture, automobile, sensors and biological systems, advanced consumer electronics and more, all of which will culminate in a world-class R&D center for the industrialization of liquid crystal technology.

Jiangsu has proactively built a pool of talent over the years. It has maintained long-term sci-tech cooperation with more than 70 countries and regions. More than 24,000 foreigners in the province hold valid work permits, accounting for one-tenth of the national total. Jiangsu has more cities listed in the "Most Attractive Chinese Cities for Foreigners" than other provinces of China.

Jiangsu has laid out the red carpet for foreign experts and entrepreneurs from across the world to bring their innovative spirit and start up businesses in a province which provides the optimal environment for success.

Source: Department of Science and Technology of Jiangsu Province

Automated Vehicles Enter Commercial Trial Phase in China

By ZHONG Jianli

Energy and transportation, autonomous vehicles, big data and blockchain, and new-generation AI maps were all on the agenda at the 2021 China Intelligent Transportation System (ITS) Conference in Changsha, Hunan province on December 6.

In recent years, continuous innovations in science, technology and engineering have promoted the rapid development of China's ITS industry. The emerging models and forms of business are bringing about more efficient and coordinated development of the industry.

Vehicle-road coordination, autonomous driving, and vehicle-network connections are the important directions in development of the ITS.

The Beijing Economic and Technological Development Area is innovating policies to develop autonomous driving. Designated as a high-level automated driving demonstration zone, a host of self-driving scenarios are realized or tested here.

For example, you could book a driverless car via an APP, and a Robotaxi will pick you up and deliver you to your destination, or you could also stop a self-driving food vehicle with a wave of your

hand and scan a QR code to pay for some snacks.

The Authority of the Area has released 20 application scenarios for Intelligent and Connected Vehicles (ICV). It is guiding industrial institutions and enterprises in innovating more ICV scenarios.

In November, the Area was the first in China to roll out some management policies for commercial trials of autonomous driving travel services. Enterprises that are permitted to undertake pilot commercial activities will be restricted to a 60 square kilometer area in the Beijing Economic and Technological Development Area.

Baidu and Pony.ai are the first enterprises authorized to launch the pilot services. They will put about 100 autonomous vehicles into service in the Area.

According to the policies, the enterprises can adopt a market-oriented pricing mechanism based on the principle of fair competition, but need to inform the passengers of the pricing standards and payment methods before providing services.

The high-level automated driving demonstration zone will expand the trial areas in due course so as to upgrade the travel service for the public.

Foreign Sci-tech Commissioners Offer Suggestion for Xiamen's Innovation

Edited by CHEN Chunyou

A talent exchange event themed on sci-tech empowerment of industrial innovation was held in Xiamen, Fujian province on December 1.

Xiamen is the birthplace of the for-

ign sci-tech commissioner. The expats from India, Singapore, Egypt and so on, were nominated in the first batch of commissioners. They have expertise in the areas of animation design, marine ecology and smart manufacturing. In this event, two foreign experts shared

their experience to local animation enterprises.

Riyad Chalakkara Muhammedali came from India and has been working for 15 years in the animation film industry. Now, he is responsible for character animation in Xiamen's Beishi Cultural Development Company. This August, he was employed as sci-tech commissioner of Xiamen.

During the event, Muhammedali conducted in-depth exchanges on a cultural export project with a team from Xiamen's Tianyi Animation Culture Media Company. The two sides hope to find complementary advantages in 3D animation technology and computer graphics technology on film and television.

Philip Lambert, deputy dean of the Institute of Creativity and Innovation, Xiamen University, said that allowing students to gain experience via internships at various enterprises, and encouraging foreign experts to interact with Chinese enterprises, can ensure that teaching and scientific research remains a priority in the industry. Also, creative experts with a global vision will be provided to enhance Xiamen's animation industry, said he, adding that foreign teachers are happy to act as sci-tech

commissioners, and make a contribution to industrial innovation and development.

Lambert said he will bring British and European industrial standards in artificial intelligence, motion capture and 3D printing to Xiamen, to provide a point of reference for local industries when promoting exchanges of culture, science and technology between China and Europe.

After years of development, the animation industry in Xiamen continues to grow. This November, Tianyi Animation Culture Media Company was listed as the national demonstration base for integrating culture with science and technology.

The ongoing exchange of expertise not only tackles the practical difficulties faced by enterprises, but also helps them to achieve breakthroughs in technological innovation and global development. At the same time, sci-tech experts are both providing expertise to local industries as well as communicating China's voice to the world, which will help bring in more experts to Xiamen. This will help to build Xiamen into the BRICS innovation base, said Luo Lei, an official from the Xiamen Bureau of Science and Technology.

Special Lecture from Outer Space Enlightens Youth

From page 1

When doing the experiment to demonstrate the higher surface tension of liquids in microgravity environment, Wang made a water film and injected it with more water to shape it into a ball, which did not explode or collapse.

Then she put a paper flower made by her daughter on the surface of the water ball. Wang compared the students to the blossoming flowers and wished them all a bright future.

Finally, she added blue color into the water ball and inserted an effervescent tablet, causing bubbles to emerge inside the ball. The ball just seems like our blue planet, and humans are the bubbles living on it, said Wang.

But, unlike the bubbles, humans won't be satisfied with staying on the Earth. "We are exploring the enormous space outside of it," said Wang, encouraging the younger generation to involve themselves in scientific exploration careers.

Dreams coming true

The three astronauts also had real-time interaction with students at the ground classrooms.

Can you walk in space as you can on the ground? How do you deal with

the waste water? Can we send emails to you? How do you spend your spare time? What's the scenery look like from the space station? These were some of the many questions asked by students and answered by the space crew.

After the lecture, some young students shared their feelings, and what they have learned from it.

Living and working in the space station is really amazing, said a student.

The astronauts have worked very hard and overcome many difficulties in space. We should learn from their spirit, said another student, expressing his dream to become an astronaut.

The same dream and pursuit for science is being passed from generation to generation. Eight years after the first "space class," seeds that were planted have already sprouted.

Some students from Tsinghua University, who had attended the first "space class," are now trying to transform the universe into sounds audible to the human ear through a sound installation.

Another student from the first "space class" is devoted to popularizing space knowledge through videos, so that more people can experience a part of China's manned space program.



Foreign sci-tech commissioners exchange view on the scene. (PHOTO: Xiamen Bureau of Science and Technology)

Short-sighted: Sci-tech Decoupling between U.S. and China

Voice of the World

Edited by QI Liming

According to a paper released by the Freeman Spogli Institute for International Studies at Stanford University, over the past two decades, American and Chinese technological trajectories have been closely linked. Internet protocols, hardware design and manufacturing, software development and deployment, and services and standards have to varying degrees been cross border examples of cooperation.

The last few years, however, have seen a rise in America's suspicion and moves, both direct and indirect, to undermine this technological interdependence.

Lawfare website comments that imposing export controls on Chinese companies can often produce adverse effects on American companies further downstream in the supply chain.

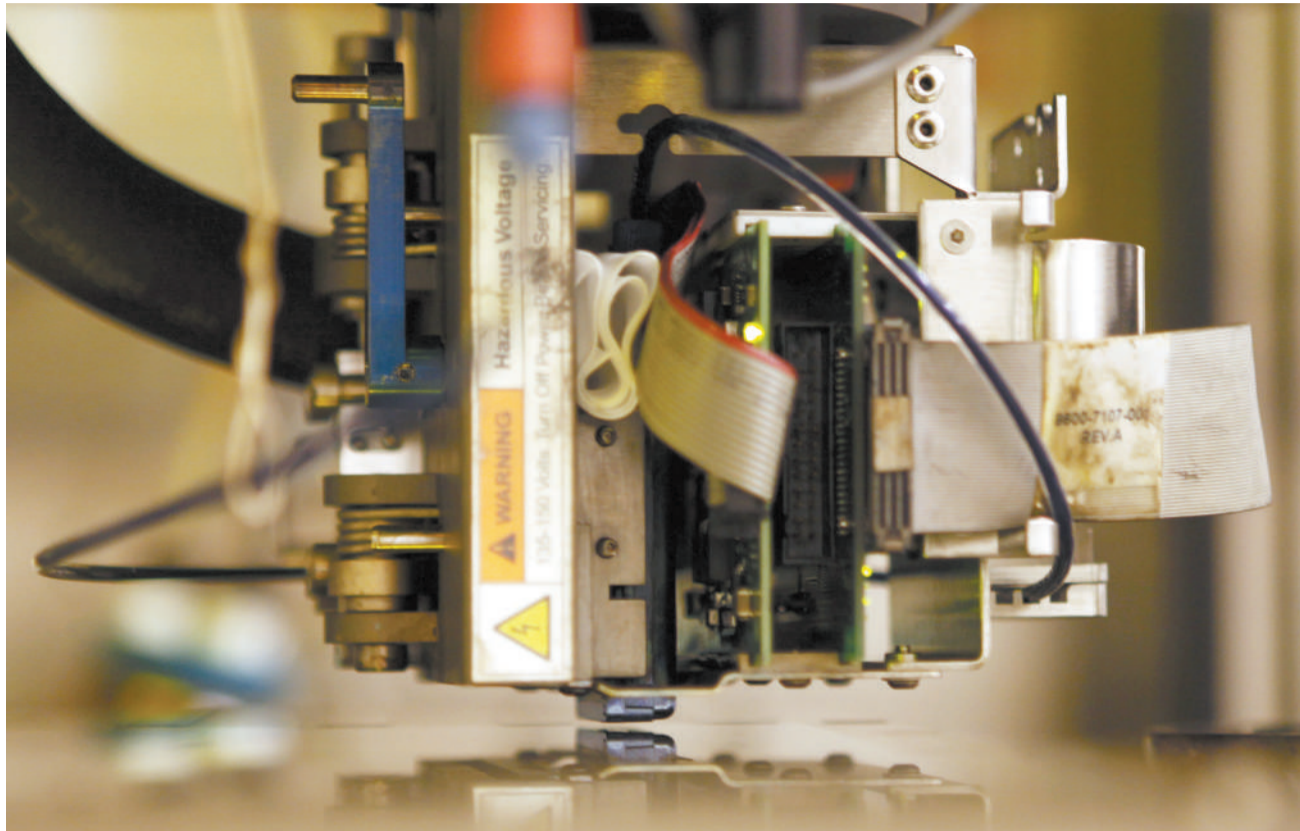
Decoupling tech supply chains at a heavy cost

Dr. Phil Levy, professor at Wayne State University, said on TechCrunch, that the technology sector would much prefer to focus on growth over geopolitics, thus the push for U.S.-China "decoupling" poses an inescapable threat.

The sheer breadth of economic interactions between the two giant economies illustrates the implausibility of a clean divide between them. Instead, the most likely result of an attempt at exclusion would be another reordering, not China's disappearance as a supply chain power.

The nebulous nature of the decoupling policy poses a particular threat to the tech sector. Over decades, the push to take advantage of scale economies and to drive down production costs have resulted in highly integrated global tech production.

A world in which the U.S. provides an extreme answer to the above issues is likely to be one in which the U.S. cripples itself technologically, denying itself



Inorganic printed semiconductors of U.S. company Kovo. (PHOTO: VCG)

access to globally competitive sourcing and empowering competitors elsewhere, said Levy.

Sanctions harm U.S. semiconductor industry

According to Stuart Anderson, executive director of the National Foundation for American Policy, when the U.S. expanded sanctions and tightened restrictions on selling semiconductors and related technologies to Chinese companies, a U.S. technology executive told him that it would make more sense to let U.S. companies sell semiconductors, as it benefits both China and the U.S. Actually, these sanctions and restrictions have added a much greater incentive for China to fully develop its semiconductor industry.

As for the production of semiconductors, investments have to be made on a large scale and well in advance. That leaves the sector especially vulnerable to rapidly shifting rule changes, said Levy.

The technology executive's predic-

tion has come true. According to a recent report by Krane Funds Advisors, they believe that strong government investment, favorable policies, and the potential for domestic demand to skyrocket make China's semiconductor industry an attractive and long-term investment. Besides, digitalization trends from 5G development and vehicle technologies that are outpacing the rest of the world also add momentum to the domestic market.

Sanctions harm the ability of U.S. semiconductor companies to innovate. "The U.S. semiconductor industry has typically derived over a third of its revenues from China sales," said Verdict, which tracks technology issues. According to the Boston Consulting Group, the scale provided by China's large and growing market has been a key enabler of the U.S. industry's virtuous innovation cycle fueled by R&D intensity.

A report from the Semiconductor Industry Association (SIA) explains that semiconductors are America's fifth larg-

est export. The export control policies are "likely to harm U.S. competitiveness and the industrial base and be ineffective in achieving national security goals," said the report.

Future expectations

The only politically viable alternative at the moment, a world in which the U.S. takes a more moderate stance and struggles to find a middle ground, is likely to be an unpredictable one in which rules are constantly evolving, said Levy.

In either case, proponents of U.S.-China decoupling will find such a move counterproductive. Far from resolving strategic policy concerns, its primary impact may be to challenge U.S. technology strength instead, added Levy.

U.S. technological policies toward China have backfired. In conclusion, the ripple effect on the U.S., the initiator of this decoupling, is far from their expectations. Industries, associations, and institutes have unveiled the truth and called for bridging the cooperation.

Comment

Paying with a Digital Wallet: the Way of the Future

By Staff Reporters

A digital wallet equipped with a made-in-China chip has recently been put through its paces and passed with flying colors. The wallet can be unlocked through fingerprint identification, support digital currency collection and payment, balance inquiry, transaction information display, health code loading and many other functions.

There are many types of digital currency, and e-CNY is one of them being issued and piloted by People's Bank of China (PBOC). Both individuals and businesses can open an e-CNY wallet (a kind of digital wallet) in financial institutions designated by the PBOC, to facilitate e-CNY exchange, currency storage, circulation and receipts, payment and business settlement.

Digital currency trend

Specifically, the digital wallet can be divided into software and hardware wallets. Software refers to some mobile Apps and various software development kits, while hardware refers to the key associated with digital assets being stored separately in a chip, isolated from the Internet to ensure the security of digital assets.

"China's digital currency has the same technical characteristics as blockchain technology, such as traceability and non-tampering. However, as legal tender, the central bank's digital currency has a national credit endorsement, equivalent to legal tender and legal compensation. Therefore, the central bank's digital currency is destined to be different from the decentralization of digital currency such as Bitcoin," said Liu Biao, senior vice president of Goldpac Ltd.

According to Liu, digital currency is designed based on a cryptographic algorithm, which is more secure than general encryption technology based on pure software, with the protection ability of high-security chips in hard wallets.

R&D in digital currency has become one of the important tasks of the central bank at present. The issuance and application of e-CNY in China are also accelerating. China has taken the lead in issuing e-CNY in Shenzhen and other places since last year. As of October 22, there have been more than 3.5 million e-CNY pilot scenarios in China, and the total number of its users have reached 140 million, with a transaction amount of about 56 billion RMB.

Current payment methods won't change

Liu said digital wallets are more secure and their operating systems are more efficient. "In the final analysis, the common payment methods belong to enterprise behavior, which has hidden dangers in data leakage and information security. The e-CNY issued by the central bank is legal tender and belongs to gov-

ernment behavior, meaning the relevant transaction information of the public can only be controlled by the central bank, which is safer," he said.

According to Liu, the opening of a digital wallet is like applying for a bank card. The digital wallet can operate as a "one-to-one correspondence between people and cards" to prevent accidental brushing and stealing. In addition, compared with the software wallet, the digital wallet can be used to make normal payments (online and offline), to alleviate the plight of the elderly who can't use electronic products in the digital age.

Therefore, the digital wallet has little impact on the current payment environment, said Liu, adding that, "The biggest impact is to provide another payment method in daily life, which is more convenient and safer to upgrade."

Application scenarios will be more and more abundant

Up to now, the pilot areas of e-CNY in China cover most provinces and cities. Among these places, some have introduced incentives for using e-CNY to attract consumers.

Many buying scenarios, such as food markets and shopping malls, had been developed in Shanghai, Shenzhen, Chengdu, and other e-CNY test areas. As of this October, CHINAUMS has accepted 55,000 e-CNY merchants nationwide.

The popularization of digital currency will bring new opportunities for the digital wallet. "With the further extension of digital currency's usage scenarios, the further cultivation of public trading habits and the wide application of cross-border payments in China, digital wallets will be the mainstream of payment methods shortly," said Liu.

Mu Changchun, director of the PBOC Digital Currency Research Institute, said that although the current pilot project has been running quite smoothly, the construction of the acceptance environment is still in progress, and it is necessary to transform and upgrade the acceptance system for all merchants. Moreover, the user experience needs to be improved through diversified, intelligent, customized wallet choices and extensive usage cases.



A staff member shows a digital 'hard wallet' in Shanghai Jiao Tong University. (PHOTO: XINHUA)

Hi! Tech

Four Drilled Ice Cores Could Hold Secrets of Climate Change

Edited by QI Liming

Chinese scientists successfully drilled four ice cores from glaciers in Xi-

zang Autonomous Region, as part of the second Qinghai-Xizang scientific expedition.

Ice cores are drilled from the in-



Scientists drill ice cores in the Qinghai-Xizang Plateau. (PHOTO: CCTVNEWS)

side of glaciers. Like tree rings, the ice core is a medium that can extract information about past climate and environmental changes. The material in the atmosphere is brought above the glacier by atmospheric circulation, then settles on the surface of the ice and snow, and eventually forms the ice core.

Xu Baiqing, researcher at Chinese Academy of Sciences, said that of these four ice cores drilled this time, two were 80 meters deep, drilling directly into the rock layer, and two were about 35 meters deep into the water layer. It was the first time scientists successfully drilled ice cores from the source of the Nujiang River, located more than 6,000 meters above sea level.

Science tries to find how the monsoons evolved at different time scales, how the west winds evolved and how

two kinds of wind interacted, through clues in the drilled ice cores.

The most important task of researchers is to recover and discover some laws, cycles and their impact on the ecological system and environmental evolution of the Qinghai-Xizang Plateau, solving the mechanism of environmental change on the Plateau and helping to monitor the dynamic changes of Asian water towers.

According to Xu, the expedition, which lasted from July to the end of November, faced many challenges. Firstly, the mountain where the ice core was drilled had never been climbed before. Secondly, 8 to 9 grade winds at the top of the mountain was a major obstacle to drilling. Thirdly, the 6,200-meter ice core drilling camp and the loading and unloading of supplies are fraught with difficulties.

Space Rockets to be Launched from Ship at Sea

Edited by QI Liming

China is building a specially designed ship for launching rockets into space from the sea, to help boost the capacity to launch satellites and recycle rocket stages. The new ship is expected to enter service in 2022.

The 162.5 meters long, 40 meters wide rocket launching vessel is being constructed for use with the new China Oriental Spaceport in Haiyang, Shan-

dong province.

The ship will be used to launch solid-fuel rockets such as the Long March 11 and Smart Dragon 3, which is still under development. According to a post on a Chinese social network, in the future it could also be used to launch rockets powered by liquid fuel.

Maritime launches have several advantages. With new space companies emerging and major constellation plans in the works, along with preparations

for major space station missions, the sea launch option will provide more routes to orbit.

One of the advantages is flexible launch pad placement means it's much easier to choose a flight path that doesn't pass over other countries, and eases the pressure on China's four main launch centers.

Another advantage is the possibility of launching closer to the equator, where the Earth's rotation speed gives

the rockets an extra "boost," which means that less fuel is needed to reach orbit.

The Haiyang base will also have the capacity for rocket assembly and testing, and produce up to 20 solid rockets per year. In addition, future plans will enable the site to produce more complex liquid propellant rockets. China Rocket Co. Ltd. has signed a contract for launches from Haiyang.

China-Africa Cooperation Deepens

From page 1

Sharing experiences on poverty reduction is another major area of practical cooperation between the two sides, along with infrastructure construction projects such as railways, roads, airports, ports and power plants have been carried out with substantial assistance from China. As of 2020, China had also set up more than 3,500 companies in Africa, creating job positions for about 400,000 Africans each year.

In addition, China has assisted Africa in the construction of more than 20 agricultural technology demonstration facilities, benefiting more than 500,000 people while promoting poverty reduction and elimination.

Further cooperation in emerging areas such as the digital economy and low-carbon development are included in the first three-year plan of the China-Africa

Cooperation Vision 2035.

According to the digital innovation program, China will undertake 10 digital economy projects for Africa, set up centers for China-Africa cooperation in satellite remote-sensing application, and support the development of China-Africa joint laboratories and sci-tech innovation cooperation bases.

To expand the Belt and Road Initiative e-commerce cooperation, China plans to work with African countries holding online shopping festivals and tourism e-commerce promotion activities, and launch a campaign to market 100 African stores and 1,000 African products on e-commerce platforms.

As China and Africa continue to cooperate in communications and the Internet, the digital economy is expected to usher in a new era of development for Africa.

LIFE IN CHINA

Life-long Passion for Scientific Research

By LONG Yun

The study of how biological cells receive signals and how these are transmitted to cells is an area of essential scientific research with the long-term goal of generating novel medications to treat many diseases.

Professor Horst Vogel, a member of Swiss Academy of Sciences and an elected fellow of National Academy of Inventors (USA) and chief scientist of the Computer Aided Drug Discovery Center of the Shenzhen Institute of Advanced Technology (SIAT), under the Chinese Academy of Sciences (CAS), is involved in such research.

He recently spoke to the *Science and Technology Daily* about how his curiosity motivates him to work as a scientist and how he aims to make some dis-

coveries in disease research that will benefit society.

Shenzhen has R&D potential

Vogel has spent his entire scientific career researching biology with fruitful results, but he has never rested on his laurels.

He worked as head of research laboratory as professor at the Swiss Federal Institute of Technology Lausanne (EPFL). In 2018, he accepted his former PhD student, Professor Yuan Shuguang's invitation to help to set up a new research center at SIAT, and settled in Shenzhen.

Vogel found that Shenzhen has excellent potential for R&D at SIAT and the many nearby universities.

"Shenzhen is one of the most dynamic cities in China. Thanks to the government's strong support for science and technology, I decided to continue

my research and develop new projects in Shenzhen. The city has invested much money in new technologies, for example in the field of the novel electron microscopic techniques. I want to further develop this technology together with colleagues from SIAT and neighboring universities, to improve decoding protein structures which is the basis for discovering novel drugs," he said.

A lengthy process of R&D to novel drug reality

Transforming scientific and technical research achievements is difficult but necessary, with Vogel saying the whole process of developing new drugs usually takes ten years or more. Furthermore, while drug development needs a lengthy R&D time frame, it also requires adequate funding.

However, Vogel hopes to develop new biotechnologies and new computer models at SIAT to reduce the entire process of developing novel drugs dramatically. "In the future, preclinical studies will be much more efficient than they are today in the traditional pharmaceutical sector," he said.

"The development of novel drugs for serious diseases does matter, and it is crucial to contain the current [COVID-19] pandemic, as well as other diseases like diabetes, cancer, and Alzheimer's that require basic scientific research to achieve good outcomes," he said.

International cooperation benefits all

Vogel explained that researchers must move quickly to make a breakthrough in the intense competition and challenges they are facing. However, he said his team members are hardworking

enough to overcome the challenges they face daily.

He spoke highly of the role of international collaboration in the science and technology communities, adding that it is critical for eradicating misunderstandings and minimizing friction. Sharing knowledge benefits all parties involved in international cooperation.

China is now taking an active role in international cooperation. Vogel suggested that it is important for student and scientist exchanges to participate in global cooperation and facilitate the flow of knowledge. He applauded China's measures in attracting foreign scientists in this regard.

Life in China

Vogel said he had been highly involved in Shenzhen's daily life over two years, in addition to committing himself to his research work. He enjoys trying different Chinese cuisines and taking in the modern environment. At the same time, he is fascinated by learning about China's tremendous economic and social progress over the years.

Vogel said he was overjoyed to receive the Chinese Government Friendship Award in 2020 for his excellent contributions to China's development. "This means a lot to me, and it will inspire my team and me to keep contributing to scientific research," he said.

He will continue to do fundamental research in Shenzhen, help share his knowledge with students and collaborators, and boost innovative drug discovery.

He has always maintained that undertaking research and mentoring young scientists provide him pleasure rather than additional burdens.

Letter to the Editor

Culture, a Supplement to Glorify Chinese Nation

By Salma Ibrahim

Over thousands of years, Chinese were capable to form a rich and unique culture. This culture has always been the spiritual supplement for the Chinese nation in its voyage to glory.

Today's China enjoys a rich heritage and unique factors of civilization that no other nation has ever enjoyed; a majestic history of thousands of years, a language with more than one billion speakers, which tops the list of most important languages to learn in the last decade, a marvelous geography which enabled the Chinese to develop independently from other world civilizations, and infinite and profound Chinese values which have spread far beyond its borders.

China now enjoys all the factors needed for a nation aiming for a prosperous and bright future. These characteristics have been embodied through the unique Chinese culture.

In China, government and citizens are united in moving towards progress with a selfless spirit in order to achieve what is in the public interest.

The Chinese model has been achieved through a wise leadership of government and through the dedication and vitality of Chinese people with their energy and capabilities employed to benefit their nation and even the world.

The strength of Chinese society lies in the strength and capabilities of its people, so it was a priority for the Chinese government to decrease the rate of illiteracy, to eliminate poverty, and to provide individuals and society with all the means needed to enjoy a better quality of life.

This vision is enabling Chinese people to innovate and to be creative in fields that include science, the arts and technology. China also has some of the world's most innovative tech companies, and is good at artificial intelligence and technology outputs, including the number of patent applications and the percentage of high-tech exports in its total trade. It made China at the top of the largest economies in the world.

Among all progress and success achieved in many fields, education in China remains one of the most important and basic elements in Chinese life, because Chinese people believe that knowledge and education give societies and nations higher status, and they believe there must be an association between science and humanity, knowledge and character, and also between politics and principles.

The Chinese model of education aims to build generations capable of developing their lives, communities and their nation through innovation and progress in various fields and directions



Professor Salma Ibrahim. (COURTESY PHOTO)

of modern life. Through such an advanced attitude, society will be stronger because it is built on scientific foundations.

In the last decades, as a response to the call for development and progress, Chinese people found themselves in a race against the time, so they chose to take action, not to be reactive. They work hard, learn fast and sacrifice their comfort, believing that with more efforts there will be more prosperity, and success is a result of self-belief and hard work.

Today's prosperity did not come from nothingness, but rather, is the result of concerted efforts and intense challenges.

In China, education is the fundamental factor of development, because there is a strong belief that education is the path to raise people's productivity, encourage their creativity and promote entrepreneurship and technological advances.

In addition, education in China plays an important role in securing economic prosperity, social progress and improving life quality, since only winners can write the future.

In more than a decade of living and working in China, I have witnessed how students and learners, and families, are aware of the relationship between education and socioeconomic development, as they see how education brings a change in outlook in the individual which promotes productivity and work efficiency.

In China, learning and education emphasize humanity and service to others, and that can be translated into how China assists countries around the world whenever and however they needed.

Ms. Salma Ibrahim is a professor of Arabic and Cultural Studies at Sichuan University of International Studies.



Professor Horst Vogel. (COURTESY PHOTO)

Traditional Eastern Wisdom

One of the Four Great Inventions of China: Paper-making

By BI Weizi

Paper-making, one of the Four Great Inventions of China, was invented in the Western Han Dynasty (202 BC - 9 AD) and improved in the Eastern Han Dynasty (25 - 220 AD). In particular, the paper-making technique improved by Cai Lun (also known as Cai Hou Paper) brought a revolution in writing. Cai Hou Paper was easy to carry, incorporated many different raw materials and promoted the cultural development of China and even the whole world.

Before paper was invented, people throughout the world wrote on many different kinds of natural materials. Ancient Egyptians used papyrus scrolls to write down history; in ancient Europe, people wrote on animal skins; while in

ancient China, bones, tortoise shells, and bamboo strips were all used for writing, which were later proven unsuitable because of their bulk and weight. Hemp fiber and silk were also used to make paper, but the quality was far from satisfactory.

By the Han Dynasty, due to its rapid economic and cultural development, oracle bones, bamboo and silk were far from adequate to meet people's needs, which resulted in the improvement of a writing medium. The invention of paper is a symbol of advanced science and technology in ancient China.

Improved paper-making traditionally dates back to 105 AD, when Cai Lun, an official at the court of the Han Dynasty, made a sheet of paper from mulberry and other coarse fibers as well as

fishing nets, old rags, and hemp waste. This kind of paper was much lighter and cheaper than previous materials. And it was more suitable for Chinese calligraphy.

Paper has been used for wrapping in China since the 2nd century B.C., and it was not widely used for writing until the 3rd century. By the 6th century, paper also began to be used as toilet paper. During the Tang Dynasty (618-907) paper was folded into square bags to preserve the flavor of tea. The subsequent Song Dynasty (960 - 1279) was the first government to issue paper money.

The invention and use of paper also brought about a revolution in writing, paving the way for the invention of printing technology in the years to come.



Cai Lun improves the paper-making technique during Han Dynasty. (PHOTO:VCG)

Daily Life Myth Buster

By Staff Reporters

Myth: Too much static electricity is illness-related.

Truth: The strength of static electricity is related to clothing materials and air humidity

Some people have recently raised the problem of common static electricity, claiming that excessive static electricity is an indication of disease. According to rumors circulating around the Internet, the increased occurrence of cardiovascular and cerebrovascular disorders in autumn and winter is caused by static electricity. Arrhythmia is more common in persons who have more "electricity."

"Static electrical strength has nothing to do with physical health," Professor Zhang Sheng of Tianjin University's School of Chemical Engineering told *Science and Technology Daily*, Zhang explained that static electricity is created by an uneven distribution of positive and negative charges. When a person

walks and moves, friction between the sole of the shoe, the floor, and the clothing creates an electrostatic field. If the shoe sole is insulated, the charge on the human body accumulates, and the discharge occurs when it comes into touch with other items.

"Because of the dry weather and the clothes you wear in the winter, your body's ability to charge electricity improves. The majority of clothing is made of chemical fiber, which is more likely to generate static electricity. The human body can readily build a substantial amount of electric charge after friction," said Zhan, adding that if the air humidity is high, the growth of tiny droplets in the air will enhance the conductivity of the air, reducing the charge collected on the human body, and the phenomena of static electricity will not occur easily.

It can be noticed that a person's static electricity is more closely tied to the material of their clothing and the humidity of the air. Furthermore, current

research findings indicate that static electricity has little direct effect on an organism's internal function, with the exception of causing surface irritation to the hair and skin.

Myth: Absorbing hydrogen or drinking hydrogen-rich water can help to slow down aging.

Truth: The working mechanism behind is not clear.

With the advocacy of anti-aging via absorbing hydrogen or drinking hydrogen-rich water, many enterprises sell hydrogen absorption equipment and hydrogen-rich water dispensers. According to the promotion from these sellers, hydrogen absorption or drinking hydrogen-rich water can help fight cancer, improve sleep, and cure all diseases.

The role of hydrogen in anti-oxidation, reducing inflammation, and inhibiting tumor growth does not seem to be groundless. A recent study found that by controlling specific cell signaling pathways, hydrogen could activate en-

dogenous antioxidant enzymes in cells or lessen the harm caused by oxidation to the human body. Several recent researches have found that hydrogen can influence the concentration of immune cells or immunological components in the blood, preventing tumor growth.

At the moment, the varied impacts of hydrogen are still in basic research stage because the exact mechanism of hydrogen's anti-oxidation characteristics at the molecular level has not yet been thoroughly investigated. It is partly because hydrogen still holds many mysteries, and further research findings and data are needed before it can be used in clinical treatment.

The use of hydrogen to cure or prevent diseases is a medical practice that must be carried out in hospitals or medical institutions under the supervision of a certified doctor. Experts do not advise to expect that hydrogen absorption may treat all diseases and to try sucking hydrogen or drinking hydrogen-rich water.

Photo News



Li Xin, deputy director general of Department of Foreign Expert Services of Ministry of Science and Technology (MOST) introduced the Weekly Edition of Science and Technology Daily in the event of exchange with foreign experts on December 10, 2021 in Beijing. (PHOTO: MOST)