

BASF information

December 2013

Cover story

China's future farming

Features

From trash to treasure

World's lightweight future

Local color design "Making Headway"

 **BASF**

The Chemical Company

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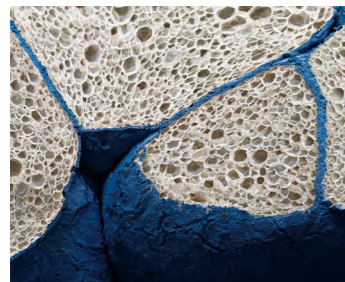
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Foreword



I'm very glad to welcome you to the latest issue of *BASF information*. As you may notice, the publication now has a new look after successfully running for several years in Greater China, with more in-depth stories on BASF's strategic areas and in engaging more of our stakeholders to share their perspectives. This time, we pay special attention to the biggest job on earth – farming.

As the world keeps turning, increasingly more people need to be fed. China currently accounts for 7% of total agricultural acreage globally, while feeding 22% of the world's population. Farmers in this country have to maintain their crops and harvests for people's daily food, despite seasonal storms, lengthy droughts or bone-numbing cold. In future, apart from unpredictable weather, the challenges for farmers will become greater in terms of soil degradation and water scarcity.

With the world constantly changing, increasingly the ways of farming also has to change. This demands our continued commitment to creating innovative solutions for the agricultural community that go beyond crop protection. In this issue of *BASF information*, you will discover how BASF works with Chinese farmers to create chemistry that can keep soil fertile and fruitful, helping to maximize yields and produce fitter, healthier crops.

The way we treat our waste also impacts farming – nutrients in organic waste can be returned to the soil in the form of compost, with help of the biodegradable and certified compostable bags made of BASF's *ecoflex*[®] and *ecovio*[®]. What's more, if all organic waste in China was to be collected separately and composted, 45 million tons of carbon dioxide equivalents could potentially be reduced annually. In the feature story "From trash to treasure", get a close look at the business model behind the composting of organic waste.

Also in this issue, our colleagues in the auto industry, together with other experts in the areas of coating, engineering plastics and polyurethanes, present the latest development in lightweight solutions and the true colors of local auto design, contributing to a better quality of life.

I hope you enjoy reading this issue of *BASF information* that was developed with the joint efforts among our colleagues, customers and partners in Greater China.

Sincerely,

Albert Heuser
President, Functions Asia Pacific, BASF
President and Chairman Greater China, BASF

World in figures

150 years

It takes more than 150 years to form one centimeter of topsoil, however we are losing topsoil every year due to various reasons, resulting in great losses for farmers. Proper soil structure and nutrition management has a critical role to play in maximizing production and reducing greenhouse gas emissions. See **China's future farming** on page 8.



Food and nutrition

22%

China feeds 22% of the world's population with merely 7% of the arable land.



19g

Each kilogram of organic waste that goes to landfill is estimated to generate the equivalent of 4,000 grams of carbon dioxide, whereas emissions from industrial composting amount to only 19 grams. See **From trash to treasure** on page 16.



Resources, environment and climate

45 million tons

If all organic waste in China was to be collected separately and composted 45 million tons of carbon-dioxide equivalents could potentially be reduced every year.



95:143

The European Union (EU) agreed to a deal to enforce stricter rules on carbon dioxide emissions for all new EU automobiles from 2020, aiming to ensure an average of 95 grams of CO₂ per kilometer. However, statistics show that by the end of 2011 German-made cars still emitted more than 143 grams of CO₂ per kilometer on average. See **World's lightweight future** on page 22.



Resources, environment and climate

10g

It's estimated that, on average, a weight reduction of 100 kilograms reduces CO₂ emission by 10 grams per kilometer.



€15 billion

Worldwide, runners spend an estimated €15 billion on their equipment. Customers place top priority on good footwear. See **Small beads, long distance** on page 34.



Quality of life

2,500

For every midsole, adidas needs about 2,500 of these small beads.



People development

70:20:10

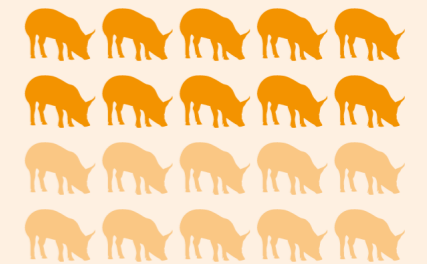
According to 70-20-10 rule, people realize usually 70% of their learning on the job, 20% through interaction with others and 10% from classroom training.



Food and nutrition

2 times

By 2030, the world will consume twice as much meat as in the 1960s. Farmers therefore have to produce more meat while at the same time minimize the environmental impacts of their activities.



Resources, environment and climate

80%

By 2050, water in rivers will increase 10% to 15% in winter, but decrease by 80% in summer. To prevent possible floods and droughts, farmers will have to improve water recycling and invest in collecting systems, advanced irrigation systems and winter-pool.



Winter



Summer



New technical service laboratory for mining solutions

BASF will open a technical service laboratory serving China's mining industry at the BASF Innovation Campus Asia Pacific in Pudong, Shanghai. The laboratory will begin operation at the beginning of 2014, adding to BASF's existing global mining solutions technical network.

BASF provides solutions that contribute to efficient and sustainable mining. Driving excellence in application technology and promoting the use of BASF's product offering in the Chinese mining market will be the primary focus of the new laboratory.



BASF breaks ground on new Ultramid® polymerization plant in Shanghai

BASF broke ground on the construction of its new Ultramid® polymerization plant with a capacity of 100,000 metric tons per year in Shanghai, China on Sept 6, 2013, further strengthening its global production and supply network. Located in the Shanghai Chemical Industry Park, the new facility will be BASF's first polyamide polymerization plant in the Asia Pacific region. It will serve the strong growth markets for polyamide products in the engineering plastics, fiber and film industries, particularly in China. The new plant is planned to start up in 2015.



BASF launches new campaign film

BASF has launched a new film within its global advertising campaign, which explores themes of connectivity and sustainability. The company presents itself in a commercial film that is not only broadcasted on TV in several countries worldwide but also available in the digital world. By clicking on an ad image online, users will be led to the BASF microsite www.wecreatechemistry.com. During the film a number of hotspots provide access to more detailed information.



Students rank BASF one of world's top 50 most attractive employers

BASF is one of the world's top 50 most attractive employers in 2013. The rankings are based on the nomination of almost 200,000 business and engineering students from top universities in the world's 12 largest economies including China, Germany, Japan, UK and USA.

BASF will create around 9,000 jobs in the Asia Pacific region by 2020, and aims to attract and retain the best team in industry. This is crucial to BASF's long-term success in the region. BASF is investing in development for employees. One prominent example is the establishment of its global Learning Campus in Asia Pacific, including a facility in Singapore.





BASF showcases new and lightweight innovative solutions for high-speed rail

BASF showcased its innovative solutions for high speed railways such as its lightweight solutions for rail vehicle construction and new functional materials solutions for rail vehicle interiors, at High-Speed Rail Summit and Exhibition 2013 in September.

Backed by its extensive international experience in high speed railway projects and strong research & development capabilities, BASF is committed to supporting China's ambitious plan of building 30,000 kilometers of high-speed railway lines by 2020.

Shanghai Tower marks milestone for BASF admixtures technology

The topping-out ceremony of the Shanghai Tower, China's tallest building and the world's No. 2 in height at the time of the topping out, was held recently. BASF's cutting-edge admixture Rheoplus® 325, powered by sureTEC and Smart Dynamic Concrete™ technologies aid this \$2.2 billion project to reach its new height. In 2010, Glenium SKY concrete additives from BASF also contributed to the success of Burj Dubai.

BASF's advanced technology ensures that the concrete construction quality was maintained during the single, uninterrupted pour, while still meeting the tight schedule. Concrete flowability and cohesiveness issues were successfully surmounted during pumping using the product. It also helped achieve the successful continuous pour of 60,000 cubic meters concrete pour for the Shanghai Tower base slab in April 2012, a world record as the largest volume, continuous concrete pour of civil infrastructure.



Customized climate: the first PU high-performance insulating material as a ready-to-use panel

To conserve resources in day-to-day living, thermal insulation – be it in buildings or refrigerators – has an important role to play: because good insulation reduces energy costs, has a positive impact on the carbon footprint and thus contributes to climate protection. BASF has developed a unique high-performance product for the insulation sector that is scheduled for launch in just a few years. The material displays exceptional insulation performance: it is extra-slim, light and will be produced as a ready-to-use polyurethane panel that is easy to process.



An e-bicycle as "thought experiment"

At the K 2013, the world's largest plastics trade show in Duesseldorf, Germany, BASF exhibited a concept bicycle to demonstrate potential capabilities: conceived by the design agency DING3000, the "Concept 1865 – Rethinking Materials" e-bike utilizes more than 20 different BASF plastics. Why 1865? BASF was founded in the year that the first pedal bicycles appeared: This is why the functional and ready-to-ride bicycle design study has taken the shape of a historic high-seat bicycle. It embodies a "thought experiment" on the subject "Rethinking materials". The vehicle is an invitation to customers to challenge established products and to develop together with the company new application ideas for mobility and urbanization on the basis of modern plastics.

China's future farming

In consideration of the substantially different agricultural conditions between China, Japan and western countries, BASF is taking a localized approach to meet future agriculture needs of China.

The photo was shot at a grape base in Shandong province in China.

Describing Chinese farmers as “great” without the least hesitation, Tracy Wu, Director of Business Management, Crop Protection Greater China, BASF, notes just as the new slogan says, “‘Farming, the biggest job on Earth’, is especially true for Chinese farmers.”

Statistically, China feeds 22% of the world’s population with merely 7% of the arable land. The country is the largest producer of many crops, including cotton, rice, potatoes and many other vegetables. Unlike most underdeveloped countries, China not only has successfully solved its subsistence problem but is also improving people’s dietary structure. Chinese people are now consuming more animal protein, however, improvements in the food chain also mean greater pressure in planting as animal feeds are derived from crops.



“‘Farming, the biggest job on Earth’, is especially true of Chinese farmers.”

Tracy Wu, Director of Business Management, Crop Protection Greater China, BASF

Agriculture, nevertheless, is not receiving the sufficient attention appropriate to its significance worldwide. “People live on food, and food comes from agriculture,” Wu said. “Yet, in sharp contrast with some emerging industries, agriculture may be the most overlooked industry simply because it is centuries old.”

Innovation potentials in future farming

Compared with emerging industries, is agriculture – the traditional industry in the eyes of many ordinary people – running out of innovation possibilities? Not really. BASF has been actively investing in agriculture for many years. “Our commitment to agriculture is evident in research and development investment. In 2012, our Crop Protection division accounted for 6% of our global sales but 25% of total R&D investment,” Wu explained.

Yung Chung, Regional Head, Industry Team Foods & Agriculture Asia Pacific, BASF, highlighted BASF’s efforts in agricultural innovation.

“In line with our sustainable development concept, BASF’s products and solutions are offering more plant health benefits beyond diseases, insects and weeds control,” Chung said. “In addition to fungi control, these products help to improve the immunity and photosynthesis of crops, which results in increased yields.”

BASF AgCelence® is the first product registered in China under the category of Plant Health. According to test results of the Ministry of Agriculture of China, AgCelence increased corn yield by about 10% and thus growers’ income. Meanwhile, crop protection products also reduced the use of highly polluting and residual chemical agents, which leads to safer foods and supports the sustainable development of agriculture.

In addition to crop protection, BASF has also established a dedicated team for nutrient and water management to develop system solutions. Taking water management as an example, BASF is currently developing a product to improve water retention in soils, aiming to prevent desertification or dry land from losing water too fast after a rainfall or irrigation. “They are like sponges in the soils to keep the water and nutrients and gradually release them to the surrounding soils,” Chung explained the technology. “This product will be launched in the near future, and we are still studying on the degradability of this product in soils.”

Seed treatment is another field of innovation. In 2012, BASF acquired Becker Underwood, the world’s leading seed bio-treatment company, for USD 1.02 billion. “Growers will benefit from better plant growth,” Chung said. (For more innovations about future agriculture, see The future farm on page 12.)

China-specific agricultural innovation

BASF has very much adapted to the local conditions in China while strengthening its investments in agricultural innovation.

“The agricultural mode of China is quite different from that of western countries or Japan,” Wu said. “Solutions ignoring the local conditions simply won’t work.” When talking about the characteristics of the developed western countries, the first thing that comes



“In line with our sustainable development concept, BASF’s products and solutions are offering more plant health benefits beyond diseases, insects and weeds control.”

Yung Chung, Regional Head, Industry Team Foods & Agriculture Asia Pacific, BASF

to people’s minds may be the boundless land, and it is normal for a couple to manage many hectares of farmland. Japan’s agriculture, in contrast, is characterized by high allowances and high food prices. Neither applies to China.

“There are few large swathes of farmland in China, and each region has its own features in terms of agriculture,” Wu said. “For instance, the vegetable production bases at Shouguang, Shandong province, are labor-intensive with many glass greenhouses to be taken care of in winter. Considering the frequent natural disasters, agricultural production may involve extremely high risks in the rice producing areas of the Yangtze Delta – one careless mistake could result in a year of scarcity.” She adds how to improve production efficiency remains the greatest challenge for China agriculture.

To promote the development of the country’s agriculture, BASF offers complete solutions adapted to local conditions. Barrel containers, for example, are changed into smaller bottles. In May, BASF announced that a new formulation and packaging plant will be established at Yangkou Chemical Park, Rudong County, Jiangsu province. The plant, with an annual capacity of 10,000 metric tons, is expected to be fully operational in 2014. BASF is also establishing Agro-solution Farms in China to develop crop protection formulations suitable to local climate conditions.

To promote the sustainable development of China’s agriculture, BASF and China National



BASF’s Crop Protection division provides innovative solutions in crop protection, turf and ornamental plants, pest control and public health. Its portfolio also includes technologies for seed treatment and biological control as well as solutions to manage water, nutrients and plant stress.



BASF remains its grower engagement initiatives as one of the key business drivers, which focus on three key areas: customized agronomic advice, risk mitigation services and global farming networks.

Cereals, Oils and Foodstuffs Corp. Tunhe, one of the world’s largest tomato producers and processors, initiated sustainability research of AgBalance™ at Tunhe, Xinjiang. It aimed to specify potential improvement strategies based on a sustainability performance study at a tomato farm focused on the use of nutrients and plant protection products.

While focusing on its own development, BASF is committed to cooperation with its Chinese partners including government organizations, universities and research institutes. “China’s agriculture sector has very

special channels of production. Over 500,000 retailers are playing an important role in helping farmers to solve various problems,” Wu said. “BASF is supporting and training them, hoping they could provide better products and solutions to the farmers instead of being driven by interests.”

Despite the challenges, BASF has increasingly been accepted and recognized by China’s agriculture sector. According to Chung, BASF has grown its market position in crop protection segment. Such growth is expected to continue in the next few years thanks to the continuous investment. ■

BASF raises 2020 sales target for its Crop Protection division to €8 billion

BASF is raising the long-term sales target for its Crop Protection division and now expects it to achieve sales of more than €6 billion by 2015 and €8 billion by 2020 (previously: €6 billion by 2020). To support this, BASF will invest approximately €1.8 billion to build and upgrade production and formulation capacities between 2013 and 2017. BASF will also continue to expand its portfolio of solutions and increase initiatives that support growers with their overall farm management.

Increased investments in innovative solutions

For the period from 2013 to 2017, BASF will double its annual investment in production plants for its Crop Protection division from approximately €150 million to more than €300 million. BASF is also planning to build new or expand existing formulation plants at several sites around the world, with strong emphasis on Asia.

Portfolio expansion through Functional Crop Care

Functional Crop Care, BASF’s newly-established unit for solutions beyond traditional crop protection products, will greatly expand BASF’s portfolio of solutions for growers.

The future farm

Energy farming

Farmers nationwide are installing wind turbines, hydroelectric generators and solar panels in their fields and turning straw into fertilizers.

To help their production, BASF is developing efficient and effective alternative energy solutions covering wind energy and solar energy.

Golden soil

It takes more than 150 years to form one centimeter of topsoil, however, we are losing topsoil every year due to various reasons, resulting in great losses of farmers. Proper soil structure and nutrition management has a critical role to play in maximizing production and reducing greenhouse gas emissions.

BASF agricultural solutions, which include crop protection, nitrogen management and degradable mulch films, help to save time and costs for farmers, reducing impacts on soil and the environment and increasing output.

New sources of protein

With summers becoming hotter and drier, and winters warmer and wetter, farmers are introducing new plants to the market making new sources of protein possible. Does anybody want bug burgers?

Food network

American farmers are selling their products on Twitter. In this inter-connected world, farmers are able to access their customers directly – they answer questions on social media, receive visiting students and launch Caring Farms initiatives right from their properties.

Healthier livestock

By 2030, the world will consume twice as much meat as in the 1960s. Farmers therefore have to produce more meat while at the same time minimize the environmental impacts of their activities. To address this challenge, they need better methods to feed and breed livestock.

BASF organic acid can be used to preserve raw materials and compound feeds, ensuring the efficiency of livestock feeding.

Water stewardship

By 2050, water in rivers will increase 10% to 15% in winter, but decrease by 80% in summer. To prevent possible floods and droughts, farmers will have to improve water recycling and invest in collecting systems, advanced irrigation systems and winter-pool.

BASF provides farmers with practical suggestions and tools for protecting water resources, and helps them reduce the impact on water during their production process.

Protecting bugs

With increasing industrial attention to biodiversity, farmers are building more hedges, using natural insecticides, and expanding field boundaries and forests.

Bees and crop protection are equally important to crop yield. BASF, valuing bees as farmers do, is committed to ensuring responsible and proper use of our products.

Go to the countryside - Yunyan's story

The problems and challenges confronting China's agriculture sector are best learned by visiting the countryside. The agriculture team of BASF Greater China not only helps them with various planting problems at the frontline, but also guides them on how to protect the environment and how to grow safe and high-quality crops.



“Using my own professional competence and wisdom to help farmers out of problems made me feel more like a professional plant doctor rather than a salesperson.”

Zhu Yunyan, sales representative, Crop Protection Greater China, BASF

Kunming, the middle region of Yunnan province, is a major vegetable planting base for China. Zhu Yunyan, sales representative, Crop Protection Greater China, BASF, came from a rural area nearby. Three years ago when she paid a visit to Chengjiang County, an important vegetable base of Kunming, she was treated as a “total stranger” by the site managers. “Cucumber growers in Chengjiang knew very little about BASF back then. To them, products from foreign companies meant ‘expensive’.”

Aware of their resistance, Zhu stopped introducing BASF and its products. Instead, she asked to pay a visit to the cucumber base. Despite their reluctance, the manager

showed her to the plant garden. It was in October during the peak season of fungal diseases and Zhu found the plant leaves yellowing and falling off. “In my judgment, cucumbers here have been caught with downy mildew and major outbreaks were expected,” she recalled. However, the site manager did not believe her and insisted that it was just some kind of bacterial angular leaf spot disease. The two diseases have similar early symptoms found on the leaf blades. It is quite difficult to tell apart without sufficient expertise and experiences. And they require totally different therapies.

Zhu left sample medicines with the manager without further explanation and asked him to provide some feedback on the trials. Three days later she received a call from the cucumber base and was told the medicine was “marvelous”. They even conducted a comparative study with the similar products, but the BASF solution stood out with overwhelming results. That was how BASF gained entry into the Chengjiang cucumber growing market. Since then, the company's agricultural solutions have been welcomed and trusted by local growers.

“I was deeply touched by this episode. Using my own professional competence and wisdom to help farmers out of problems made me feel more like a professional plant doctor rather than a salesperson,” said Zhu of the experience.

Yunyan and her team

In March 2009, Zhu, a fresh agriculture major graduate, became an intern at the BASF Crop Protection division at Yunnan. BASF, at

the time, was still a new comer to the China agricultural market with Zhu's team only having three members, including a sales manager. “BASF helped me a lot. Although I was an agriculture major, my book learning was quite different from what was needed in actual work,” Zhu said. “We took a series of trainings after entering BASF and the most impressive part was our crop protection experts showing us in the fields how to differentiate between various diseases and how to grow and manage crops in a scientific way.”

In four years' time, Zhu's team has grown to over 20 members, with the sales income increasing ten times. However, what Zhu cares about most is the rising awareness of BASF brand among local farmers.

Yuanmou County in Chuxiong is an important tomato and sweet pepper growing area of Yunnan. Other foreign brands were long established before BASF's entry into the local market. Practically no one had ever heard of BASF when the crop protection team entered Yuanmou market. Some people even asked “BASF (pronounced as basifu in Chinese), or Master Kong (kangshifu, a food brand from Taiwan)?” (Si and shi have the same pronunciation in Yunnan dialect).

Zhu and her team made continuous efforts to raise the BASF brand awareness and spread the company message by word of mouth among the local growers. They showcased product efficacy and provided customized solutions to control specific diseases at various farmer gathering events, while teaching planting and therapy skills.

“Now farmers will come to our employees in their BASF uniforms to ask questions about growing,” Zhu said. “They said our products and services are the best – we are very proud of this. In fact, BASF brands are well established in the rural area of Yunnan.”

The art of communication with farmers

Most of the time Zhu is in the field or retail shops instead of her office. She deals with three kinds of customers: professional co-operatives, growing bases and individual growers. Professional cooperatives are organizations with high level of expertise and management, procuring materials and agricultural means of production in a centralized way. They have the most government support. Growing bases are voluntary cooperative communities consisting of several growers owning scores or hundreds of mu (one mu equals 0.0667 hectares) of land. Individual growers typically own less than two dozen mu.

“Individual growers, accounting for half of our customers, have relatively lower level of expertise and management, and they are the most interesting group,” Zhu said with a smile. The majority of individual growers are teenagers graduating from middle school, 40- or 50-year-old rural housewives and 70- or 80-year-old “left-behind elderly”, characterized by poor education and a lack of growing and management expertise. “Communication with them requires language which they can understand,” Zhu said.

And this group is also the most price-sensitive, which presents a challenge for Zhu in communication. “We will sit together to do some calculations. For example, how much costs can be reduced or how many yields can be increased through one-time investment?”

AgCelence® is a BASF crop protection product to improve crop immunity and resistance to environmental changes. However, it is considered an unacceptable “additional” cost to ordinary growers who traditionally believe in “hot fixes”.

“I often compare plants to people and tell them a person has to be physically strong to better resist diseases, so are crops. AgCelence is more like ‘health care products’ for the crops,” Zhu said. “This really worked out for them. They even think of their crops when weather changes.”

Other missions

Although our top priority is to sell BASF products and solutions, BASF Crop Protection team has been making substantial effort to help Chinese farmers improve their yields and quality. For instance, Cabrio Top Big Caravan Project has offered free training in growing technologies and managerial experience to farmers. In April, the customer training was provided at the banana growing base of Yunnan in which Philippine experts were invited to share their experiences on growing and brand building. “Through this training, banana suppliers realized that it took quality and branding to make their product more valuable,” Zhu noted.

In addition to her job promoting BASF products and solutions, Zhu is also an “ambassador of food safety and environment Protection”. “When farmers are driven by short-term economic benefits and yields to use highly polluting and residual chemical fertilizers and pesticides, we will share with them the negative impacts on soils and persuade them to consider the future development of the next generations,” she said. “We are not experts and may not be the best persuader, but we will do our best. Farmers are easy to satisfy – they expect nothing more than a good yield and stable income.” ■



Yunyan was visiting the pea base in Chengjiang County, collecting farmer's planting habit and introducing the crop protection products by BASF.



The promising crops in the tomato field at Longshan Village in Yuanmou County, which used BASF's Cabrio®.



BASF created the ecovio®-based biodegradable mulch film, a product that has become an indispensable part of modern agriculture.

From trash to treasure

BASF's bio-based, biodegradable and certified compostable ecovio® offers products as well as an entire system solution where the supply and waste management of organic waste can be effectively controlled to produce high quality compost that will enrich soils.



“This practice not only contributes to reduction of greenhouse gases, it also provides a viable and more sustainable option for organic waste.”

Dr. Tobias Haber, Regional Head, Sales Management Specialty Plastics Asia Pacific, BASF

For the first time at China Fashion Week, which took place from October 25-31, 2013, all food and drinks at the event venue were served in cups and plates made from BASF's certified compostable and biodegradable ecovio®. The dishes were then be disposed together with any leftover food or organic waste in certified compostable waste bags made with ecovio, so that the waste could be efficiently and hygienically transported to an industrial composting site. At the composting site, the organic and biodegradable waste collected from the event was then converted into high quality compost. Non-organic and non-biodegradable waste, such as sweet wrappers or drinking bottles, were disposed in separate bins.

In China, most organic wastes are currently landfilled or incinerated. The landfilling of organic matter is environmentally detrimental as it generates methane, a greenhouse gas 23 times more potent than carbon dioxide. As organic waste has high water content, incineration is also not suitable as it requires significant amounts of energy and results in higher carbon dioxide emissions.

“Certified compostable bags made with ecovio enable the hygienic collection of source separated organic waste and the diversion of organic waste from landfills. This practice not only contributes to reduction of greenhouse gases, it also provides a viable and more sustainable option for organic waste,” said Dr. Tobias Haber, Regional Head, Business Management Specialty Plastics, Performance Specialties Asia Pacific, BASF. “If all organic wastes in China were to be collected separately and composted, not only would we be keeping all that trash out of landfills, we could also be saving 45 million tons of carbon dioxide equivalents every year.” (Source: US Environmental Protection Agency 2011, global emissions of non-carbon dioxide greenhouse gases)

The Secret of complete degradation

The key to successful composting lies with separate collection of certified compostable products and organic waste at source. BASF's certified compostable and biodegradable polymer ecovio can be part of the solution.

Just imagine how meaningful it could be if all tableware provided in environmentally-responsible public places, such as stadiums and convention centers, is made of biodegradable materials and then disposed of in complete biodegradable waste bags so that waste can be efficiently and hygienically transported to an industrial composting site and converted into valuable compost.

BASF also created the ecovio-based biodegradable mulch film, a product that has become an indispensable part of modern agriculture. Using biodegradable instead of conventional polyethylene mulch film enables the farmers to simply plough it into the soil along with what remains from the plants. As such, biodegradable mulch films help to preserve soil quality.

ecovio® can be used for several purposes:



Organic waste bags and shopping bags



Mulch films



Paper-coating



Shrink film applications



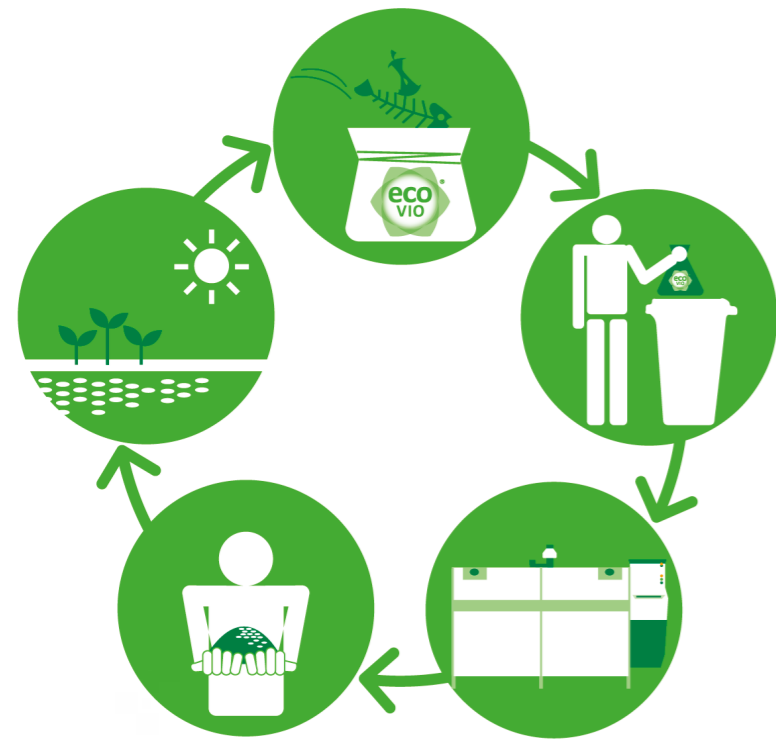
Foam packaging



Thermoformed packaging



Injection molding applications



- The closed-loop system:**
1. Use ecovio® to collect organic waste
 2. Drop in the classified rubbish bin
 3. Process in composting machine
 4. Get the compost
 5. Return to soil

The composting effect of biodegradable polymers depends on the key factors including high temperature, moisture content, aeration and carbon nitrogen ratio in the industrial composting sites.



High quality compost produced from the collection of food leftovers and biodegradable plates and cups in certified compostable bags made with BASF's ecovio® at Chinaplas 2013 are used to improve soil quality of the Guangzhou Nansha District Dagang Institute of Agricultural Sciences farm in Guangzhou.

Closed-loop system

In the closed-loop system, the operator, like BASF, controls the value chain from supply of products to waste management. With ecovio, BASF offers products as well as an entire system solution. As such, the feeding of external items into and the discharge of waste from the system is greatly limited.

The closed loop system is a sustainable business model in the ongoing efforts towards a better future. Diverting organic waste from landfills to composting facilities is a sustainable alternative for organic waste management as it contributes to a reduction in greenhouse gas emissions and extends lifetime of landfills. The closed-loop system is possible in varying degrees at restaurants, public facilities (such as schools, hospitals), leisure facilities (such as amusement parks), stadiums and businesses (such as hotels, office buildings).

Pioneering projects in China

The BASF closed-loop system solution has been widely applied in many countries, at stadiums, convention centers and restaurants, among others, in the European Union and the U.S.A. In China, some leading market players are also actively involved in the ecovio pilot projects.

In June 2012, Huali Environmental Technology, and BASF jointly announced the formation of a partnership with the Wanke Community in Wuhan to promote the composting of source-separated organic waste (including kitchen waste) in certified compostable and biodegradable bags made with ecovio. To demonstrate the closed-loop concept for organic waste, the high-quality compost produced during the project (June to August) was used as organic fertilizer in the community and on farms in Wuhan Xingzhou.

This past May, BASF and Guangzhou Joraform Environmental Co., Ltd. announced that compost produced from its joint composting project at Chinaplas has proven successful and will be used to improve soil quality at the Guangzhou Nansha District Dagang Institute of Agricultural Sciences farm in Guangzhou province. The compost produced has been tested and proven to be of high quality. ■

The new Riviera features the customized color "Ice Cyan-jade," developed by color design experts in BASF with the design team at PATAC.



Local color design "Making Headway"

How did the color of the new Buick Riviera concept car come into being? How did BASF develop its annual color trend report? BASF's color designer reveals these secrets for you.

The new Buick Riviera made its global debut in April on the eve of Auto Shanghai 2013. It immediately became a sensation thanks to its futuristic design. In August, the luxury car won the 2013 Red Dot Award, making it the first China-designed model to be honored with such a prestigious international award. Shortly after, BASF's project team on Shanghai General Motors (SGM) concept car received a thank-you letter from Pan Asia Technical Automobile Center (PATAC), SGM.

The new Riviera features the customized color "Ice Cyan-jade," developed by color design experts in BASF with the design team at PATAC. Everyone was amazed at its gorgeous color – a graceful jade-like color,

refreshing and showing rich color gradation. It appears as if the light aquamarine blue is flowing on the surface. "We didn't intend to imitate the color of jade. Instead, we demonstrate the essence of jade, which is as gentle and clean as noble characters, via the special coating," said Vivienne Liu, Color Designer of BASF China. "The overall impression delivered by color is vital."

Cooperation with SGM yields complete color solution

Last April, Lucy Li, Head of Industry Management Automotive China, BASF, was invited by Min Cao, PATAC's Chief Designer, to co-design the body color of the new Buick Riviera. "SGM is one of the earliest



"Over the years, BASF has been continuously developing local competency in color design and development, with awareness of Chinese auto market's growing demand for local design and development."

Lucy Li, Head of Industry Management Automotive Greater China, BASF



Vivienne Liu is Color Designer of BASF China

Long-term partnership with SGM

The joint effort of SGM-PATAC and BASF in supporting environmentally- friendly coating technologies and initiatives goes back a long way. The two companies cooperated in 2005 to launch the first waterborne basecoats in China. Since 1998, BASF has been a reliable partner to SGM-PATAC, supplying the full range of automotive coating products, including the latest e-coat product line CathoGuard® 800 which is commended for its tin-free and extremely low solvent content.



international automakers to emphasize local design," Li said. "Since BASF is also committed to localized design, we have been in close Cooperation for years."

BASF attached importance to the warm invitation from SGM. The local Account Team of BASF Coatings, with the support of Asia Pacific team of automotive coatings and color design center Asia Pacific, presented the achievement of BASF's color design in Asia Pacific and China to PATAC. BASF color expert Vivienne Liu explained BASF's annual color trend report and how it will be affected by current social status to the automotive designers at PATAC. "We pointed out that Asian consumers are increasingly aware of local culture and emphasized jade white color, which touched them deeply," Liu said. Cao added: "The Chinese saying goes: 'A gentleman's disposition is as graceful as the luster of jade.' The elegance of jade is very much in line with the pursuit of graceful and luxurious style in Buick's aesthetics for the future."

With an immediate consensus, both parties started their journey to seek color perfection.

"Jade symbolizing Chinese gentlemen in the ancient time is respected and adored for its grace and purity," Liu explained. "However, modern designers do not simply borrow this symbol in their works. Instead it is reinterpreted with modern features. Besides when a color of feelings is used in different objects, proper modification to highlight the overall harmony is extremely important."

In the following months, BASF worked closely with SGM to make a perfect combination of shape and color. Liu was even invited to PATAC to have a sneak preview of the "confidential" Riviera model under development. "Automotive designers have indicated they want a more eye-catching and futuristic touch to fit the atmosphere at Auto Show, which cannot be achieved with pure white, therefore we added light aquamarine blue," Liu explained. "Tones are the seasoning of colors. They need to be exactly what we want, no more and no less. That was why the color was only determined the last minute before manufacturing."

At the same time, BASF design team had to consider feasibility in manufacturing, not just

artistic design. Automotive coatings have two purposes: protection and decoration. There will be different requirements for different colors in volume production, and the factors involved in the process are very complicated. "We had to ensure the feasibility of volume production for this color," she said. "In fact, even different coating methods would lead to different colors. Therefore, what BASF delivered to the customer is a complete solution instead of coatings."

"Over the years, BASF has been continuously developing local team's competency in color design and development, with awareness of Chinese auto market's growing demand for local design and development," said Li. "The close Cooperation turned out to be very successful and it's no doubt that the "Ice Cyan-jade" was a breakthrough in the automotive color field."

Colors reflect local cultures and traditions 'With Pride'

Since 1992, BASF has published its Asia Pacific Color Trend Report, forecasting the trend in the next two to three years. With China's booming automotive sector, BASF

has accelerated its work in localized color design. Presently, the country is not only the world's largest auto maker, but also the largest consumer of autos. In 2009, Liu joined the BASF Global Color Design Team as a color designer from China. This year, the global theme is defined as "Making Headway", and in Asia Pacific "With Pride".

Coming from a chemical background, Liu joined BASF as a color specialist to formulate colors for customers. After more than a decade's work, she became involved in almost every aspect of color creation. Over time, and in becoming increasingly sensitive and culture-oriented, she is learning art design at an university during her spare time.

"Trend is a progressive course. Observation of the transition and progress helps us think about the future development."

Vivienne Liu, Color Designer Greater China, BASF

The members of the BASF Global Team come from Germany, Japan, America and China, making it a globally-coordinated network. "We study the local color trend first and generate the global trend based on the local results," she explained.

She adds that the BASF Color Trend Report is not some kind of artist poll. Instead it represents color trends on the basis of meticulous investigation and scientific

methodology. "Color trends cannot be judged by the colors for their own sake. Colors indicate social development and changes: what the society is now and what it will be in the future," Liu said. "Trend is a progressive course. Observation of the transition and progress helps us think about the future development."

Sociological changes derived from new things are one of BASF designers' greatest areas of focus, which include architecture, fashion, art, technology, local markets and important events. She said: "For example, there is increasing attention to presence and the environment after catastrophes. These important events led to the different color trends of different regions."

Liu also focuses on consumer group research. She points to BASF designers in Asia Pacific who observed the revival of local culture that reflected in changes with local consumers. "People are attaching increasing importance to local culture, and in the fashion world, be it in China, Korea, Thailand, or India. Traditional elements are intensively explored and re-interpreted with contemporary features."

The trend "With Pride" reflects people's increasing pride in their own identity and values of their own culture and lifestyle, independent of trends in developed countries. This is not only reflected by the automobile industry but also in all aspects of the whole region. ■

In 2013, the global theme is defined as "Making Headway".



BASF 2013 Color Trends by Region

Asia Pacific "WITH PRIDE"

Asia with its rapid growth is entering a period of transition. Diversity has emerged, not only in material values, but also in social attitudes and lifestyles. People are starting to talk about original designs and lifestyles, taking pride in one's identity and current way of life.

Gray tones are still important, but those required are likely to be warm grays, which create a more sophisticated, intellectual image. Colors that appeal to female users will also be important. Additionally, colors with strong tones are likely to be used increasingly, as values and vehicle categories become more diverse.



Europe "IN SOBRIETY"

Europe, impacted by the economic crisis and changes in energy policy, is striving to move forward rationally and calmly. A sense of solidarity is being maintained.

Black and gray reflect the calm image, red and green call up an image of creativity and courage. The balance among these color shade sand tones represents the region's move in a new direction, unconstrained by format even while maintaining solidarity.



North America "ASPIRE TO"

There is growing enthusiasm for social responsibility, good character, and traditional values and virtues that emphasize education and courage. The ideal, deeply rooted in North America, that anything can be achieved through effort has not declined.

Cool deep and dark tone colors with the traditional feel have been refreshed by means of depth and brightness. Solid brown, which gives a weighty impression, creates a perennial sense of assurance and stability, evoking feelings of appreciation for the earth.





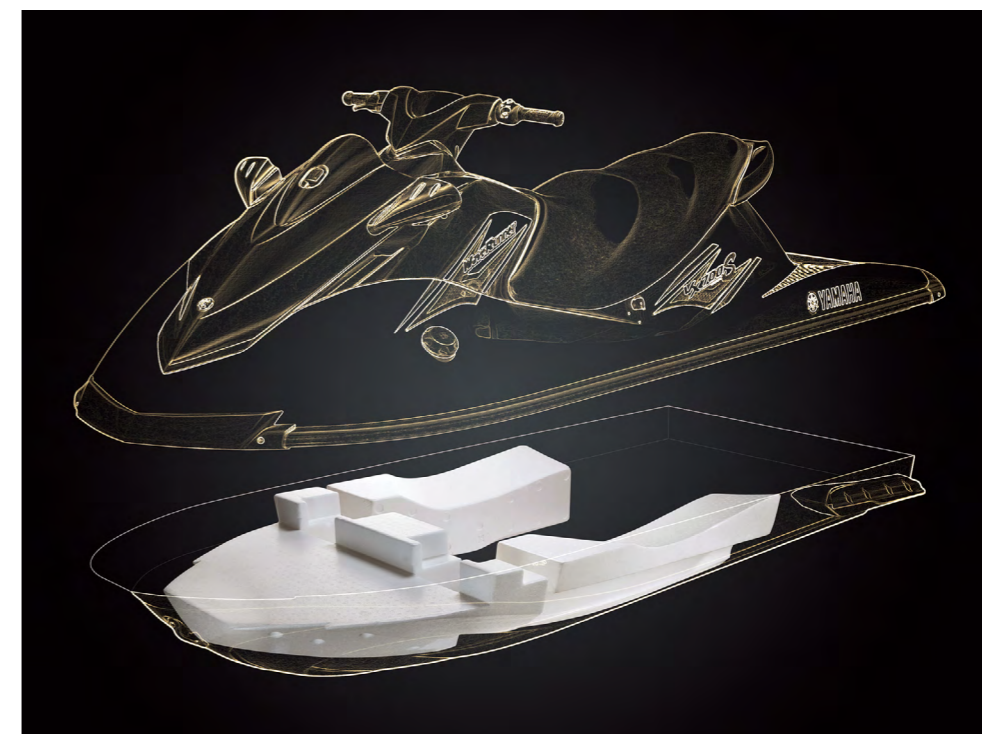
The plastic wheels on smart forvision provide an even better demonstration of the ultimate performance of engineering plastics.

World's lightweight future

From vehicles to rotor blades, from construction to home furnishings...the trend to "lightweighting", necessitated by the need for energy efficiency and environmental protection, is now everywhere in our lives.



The "Concept 1865 – Rethinking Materials" e-bike utilized 24 different BASF plastics, offering up to a 60% weight reduction potential compared to their steel counterparts.



Thanks to their unique advantages, BASF's lightweight solutions are now benefiting the transportation sector, including high-speed railway and yachting.

Though it looks like an exquisite toy, smart forvision is no-kidding matter, rather it is a forward-looking electric concept vehicle jointly developed by BASF and Daimler, one of the world's most successful automotive companies. smart forvision successfully combines the brisk style of smart with a high percentage of plastics in wheels, doors, exteriors, interiors and other components. The result is a 30% weight reduction compared with models of the same level.

"The lightweighting trend is obvious," said Dr. Piyada Charoensirisomboon, Vice President Innovation Campus Asia Pacific (Shanghai), BASF. "This is especially true in the transportation industry." In June, the European Union (EU) agreed to a compromise deal to enforce stricter rules on carbon dioxide emissions for all new EU automobiles from 2020, aiming to ensure an average of 95 grams of CO₂ per kilometer. However, statistics show that by the end of 2011 German-made cars still emitted more than 143 grams of CO₂ per kilometer on average. "Lightweighting is a must to realize this emission reduction goal," Charoensirisomboon said. It's estimated that, on average, a weight reduction of 100 kilograms reduces CO₂ emission by 10 grams per kilometer. The trend to lightweight can now be found everywhere in our lives.

People want lighter clothes, lighter computers and lighter mobile phones, among other things. Home furnishings needing frequent movement are becoming lighter. "As for transportation, the lighter planes, cars, trains and yachts are, the less energy they consume. It's no doubt that people favor lighter things, but with one condition – that their performance and safety are not negatively affected," said Dr. Ates Erk, Head of China Technical Research & Development Center, Polyurethane Specialties, BASF.



“In the automotive sector, plastics are evolving from non-load-bearing decorative components to high-strength functional and structural components that require excellent resistance to impact and heat.”

Michael Sun, Senior Manager specializing in Automotive Market Development for Engineering Plastics Greater China, BASF

Lightweighting: from decoration to function

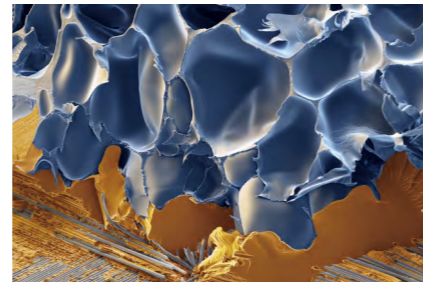
Innovations in lightweight materials provide the basis for lightweighting. To many people, plastics can only be used for decorative or non-important purposes in daily life. Nevertheless, BASF’s innovations in materials are changing this kind of view: plastics are finding their way to replace steel.

“In the automotive sector, plastics are evolving from non-load-bearing decorative components to high-strength functional and structural components that require excellent resistance to impact and heat,” said Michael Sun, Senior Manager specializing in Automotive Market Development for Engineering Plastics Greater China, BASF.

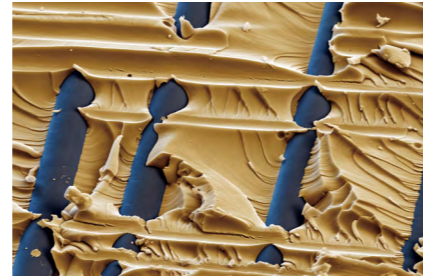
Currently, many lightweight plastic automotive parts and components, including engine covers, front-end modules, lower bumper stiffeners, transmission cross-members, turbo charged engine pipelines, oil pans and body structural inserts, have been commercialized. In addition, the doors of smart forvision are made of carbon-fiber-reinforced epoxy resin. Thanks to their unique advantages, BASF’s lightweight solutions are now benefiting the transportation sector, including high-speed railway and yachting.

The plastic wheels on smart forvision, however, provide an even better demonstration of the ultimate performance of engineering plastics. The whole wheel, except for an insert connecting to the axle, is made of plastic composites, resulting in a weight reduction of three kilos per wheel. Considering the hundreds of kilos of heavy load and the continuous rotation in driving, it’s easy to imagine how great the challenges are. “While the breakthrough of battery technologies for electric vehicles (EV) seems impossible in the near future, lightweighting becomes the obvious choice to promote the development of EV,” Sun noted. “The lightweight, plastic wheels mark an exciting milestone. It may take a few more steps for all-plastic wheels to be commercialized and our experts are striving to improve their impact and fatigue resistance.”

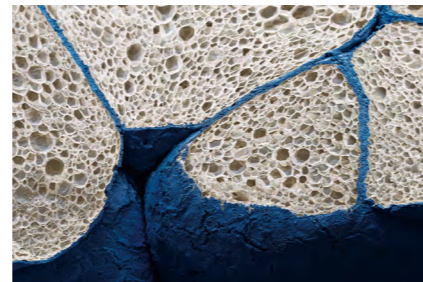
Compared to plastic vehicles, the all-plastic e-bicycle presented by BASF on K 2013 in October may be closer to commercialization. The “Concept 1865 – Rethinking Materials” e-bike utilized 24 different BASF plastics, including polyurethane composite, thermoset epoxy resin and performance foam plastic



Glass fiber-reinforced composite skinned sandwich structures are composed of Kerdyn® PET foam and the Baxxodur® epoxy system. They enable larger, highly robust and lightweight rotor blades and help make wind energy more efficient.



Following a material test, the carbon fibers remain firmly imbedded in the polymer matrix made of the Baxxodur® epoxy resin system. This kind of lightweight automobile construction reduces weight, which lowers carbon emissions.



Although BASF’s metal foams are as stable as massive metal, they weigh considerably less. The metal foams are manufactured with the help of a trick: three to five millimeter sized styrofoam spheres are coated with carbonyl iron powder in a fluidized bed.

to build wheels, body and wires. The BASF plastic body and chassis offered up to a 60% weight reduction potential compared to their steel counterparts. Thanks to lightweighting, the dream of a “portable” bicycle may come true in the near future.

In addition to transportation, lightweighting also has an important role to play in the clean energy sector. BASF, for instance, has successfully applied lightweight solutions in the manufacturing of rotor blades. Lighter blades help capture more wind resources. However, they must withstand extreme conditions, including strong wind load, air scouring, sand impact and UV exposure. In the photovoltaic (PV) sector, the BASF PV module installation frame was not only much lighter than its metal counterpart but also withstood a wind pressure of 2,400 Pa, extending the life service to over 20 years.

Lightweight and safe

Many people may currently doubt the safety and durability of plastics when they are used to replace metals in daily life, but it’s a view that undoubtedly will change with the new technologies available. “Now the application of plastics is not limited to jugs and mugs. To be more precisely, they are composites with higher specific strength than steel,” added Sun, hoping to eliminate people’s prejudices against “plastics”.

Tough and durable as steel, such “plastics” are in fact new materials combining various kinds of glass fiber, carbon fiber and metal power, which presents an important breakthrough for the modern scientific world. The composition and innovation in materials are extremely challenging and BASF research and development (R&D) teams are continually working in this field.

The design and process, however, are critical to ensure plastics parts have similar performance with metal rivals. “Material design principles are subject to specific applications demanding different properties, besides material performance differs according to the processes and methods of production,” Sun noted. “Currently, metal designer are still the mainstream and plastic designers the minority, which is why BASF, as a material supplier, is involved in the product and process design of our customers.”

According to Erk, plastics can actually be “very smart” due to their versatility. “People are inclined to consider metal solutions as

the strongest and safest ones. Nevertheless, lightweight plastics and composites, with special structural design, can effectively reduce and absorb impact energy and provide increased protection to passengers,” he explained. “Energy absorbing polyurethane foam is just one example of how plastics contribute to car safety.”

Sun emphasized all innovative material parts are subject to stringent safety tests before their commercialization. “Computer-aided simulation systems are very helpful in lowering the complexity and improving testing efficiency. However, currently they still cannot replace the final real-world tests, which ensure absolute safety of the parts,” Sun said.

“The importance of China as market for plastics and composites is growing fast and we already have a strong R&D team in Asia,” added Erk. “In the future, we will settle more and more key R&D competencies in the region to meet the needs of our customers with innovative products.”

Driven by sustainable development

Aspiration for a “portable” life and acceptance of energy-efficient and environmental-protection concepts are among the key drivers for lightweighting. This concept not only makes things conveniently “portable,” but also remarkably reduces energy consumption.

“When people talk about environmentally-friendly materials, the first thing to come up is ‘recycling’. However, BASF takes a whole-life-cycle approach to materials, which consists of four stages from raw material production, parts production, product usage to end-of-life disposal. Recycling is only a small part of it,” Sun said. “Take vehicles as an example, statistics show that product usage accounts for 85% of energy consumption in the whole lifecycle, while in sharp contrast, recycling – even in an ideal scenario of 100% recyclable – accounts for only 0.2%. Therefore, reducing the energy consumption in transportation with lightweight solutions is vital. Of course, our composite materials are actually recyclable.”

According to Charoensirisomboon: “Innovation will require more and more interdisciplinary approach, where experts in different area, industries to find sustainable solution to meet future challenges.” ■



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Dr. Piyada Charoensirisomboon, Vice President Innovation Campus Asia Pacific (Shanghai), BASF



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Post-90s Grows making their debut

By: Kathy Chen



In September, the BASF "Grow" Graduate Program™ was launched around China.

The BASF "Grow" Graduate Program™ started in 2007 aims to identify and develop talented, passionate and enthusiastic graduates across Greater China. In just seven years, nearly 300 outstanding talents have joined the company through the program. The new recruits are affectionately called "Grows". This year, post-90s Grows debut their career at BASF.

Colleagues were amazed that Sophia was a post-90s when she began her first day at BASF. The general consensus among some employees is that they feel "really old" when sitting next to such a young colleague.

Born in the 1990s and growing up in the cyber era, post-90s – often the only child in their family – have been labeled as confident, creative, off-beat, self-assertive and unorthodox. In 2013, they start to bid farewell to campus life and started their careers.

The BASF "Grow" Graduate Program™ started in 2007 aiming to identify and develop talented, passionate and enthusiastic graduates across Greater China. In just seven years, nearly 300 outstanding talents have joined the company through the program. The new recruits are called "Grows" at BASF.

This year, post-90s Grows debuted within the company.

"Self-worth" foremost

Being the youngest "Grow" in 2013, Sophia was nevertheless calm, capable and experienced in her work – in a word, very professional.

When talking about the differences between post-90s and 70s or 80s, Sophia smiled. "We favor more novel software and are fancier in our presentations. In contrast, post-70s and 80s are more traditional and few use new software like Prezi."

Readily adaptable to new things and in overall competence, these post-90s add new blood to the company. They also display stronger confidence and higher expectations in their first job.

So can the BASF "Grow" Graduate Program meet the expectations of these newcomers?

After rounds of stringent screenings over several months, Sophia, who stood out in the interviews, joined the program. Looking back at her choice, she said: "The job rotation proved to be very attractive to me, which let me experience different positions and find the most relevant field to realize my self-worth. I definitely love it!"

Lively environment and open dialogue

Jerry, another post-90s "Grow" was "adorably cute" with his short hair and rabbit teeth. He was chosen as one of the models for the campus talk campaign poster. When he saw his large portrait on the roll-up, the first thing he did was to pose for a photo with it.

In general, post-90s have enough courage to express their needs. They are independent and sensitive about their own feelings. Recognizing that, BASF is committed to building an excellent work environment in line with the "Diversity and Inclusion" culture. This enables the Grows to speak freely and promote communication between employees of different ages.

"My guide and supervisor were more than willing to listen to me and I felt quite at ease in

this mutual-respect and inclusive workplace," Jerry said." Besides, multinational companies like BASF offer great opportunities for the starters to broaden their horizons. Working with colleagues from different countries and backgrounds can be surprisingly fruitful."

Post-90s = "job-hoppers"?

Most post-90s are the only child in their family. Raised in a prosperous environment, they often do not take working or earning money as the most important thing in life. Instead, they place more emphasis on personal interest and life quality. This is why some people consider post-90s to be job-hoppers.

"For now, Grows have been quite stable in the two-year job rotation. The turnover rate is far below the industry average, meaning these young professionals are satisfied about the development environment we provide at the early stage of their career, and, of course, BASF 'Grow' Graduate Program itself," said Joyce, a specialist of the BASF "Grow" Graduate Program.

In September, the BASF "Grow" Graduate Program for 2014 graduates was launched around China. Eight campus talks in six cities were packed with eager graduates, with many of them had to stand or sit on the floor for the whole session. After rounds of evaluations and interviews, more post-90s would joined the big BASF family to create chemistry together! ■

Kathy Chen is a Grow at BASF Greater China recruited in 2013

"Open mindset" key to future growth

A fresh Grow sits down with a BASF Vice President to find out the company's expectations of new recruits and the type of mindset young employees must possess and develop to further drive their career.



Left: Jerry Shen was born in 1991 in Shanghai. He joined BASF as a Grow this July and is now working at the Care Chemicals lab at the Innovation Campus Asia Pacific (Shanghai). Right: Dr. Lars Reichmann joined BASF in 2002 and is now responsible for Human Resources in Greater China.

Shen: You've been with BASF for more than 10 years. How did you adapt to the working environment at the beginning of your career here and how can Grow trainees smoothly transit from students to professionals?

Dr. Lars Reichmann: At the very beginning, I was quite surprised how big the company is, really with a lot of people here and many specialized departments. The big challenge was not to find some experience or some knowledge in the company because we always have it, but to find the right person immediately. Once you found the person, they are always willing to share some information with you. That was quite interesting for me to see how much knowledge we have and how we use this knowledge for the company and how much you can also learn in the company.

Life at university and corporate are different. In university it's very much about learning things, while in the company it's more about applying your knowledge. Of course, internships help a lot, so that you can really be prepared from the day you enter the company.

How does BASF pick its talents? What's the focus, academic degree or capability?

For me the most important thing is an open mindset. That means your degree and specialization is kind of prerequisite. Working at BASF is very much about applying your knowledge, about facing challenges, about coming up with innovative ideas, and about taking ownership to find solutions. You can learn more tools or techniques. But the most important thing is that you are open to apply

these skills and to collaborate with other people. We need to find those talents who want to do that, who want to work in an international team, and who want to shape the future together with BASF.

How does BASF support learning and development of the employees?

It's not only for the new beginners, but we really try to have some training offered throughout the whole career. We want to emphasize "life-long learning". During work, we should learn from job as well as from classes. BASF's Employee Development Program encompasses a series of integrated career advancement initiatives aimed at optimizing the company's learning and career system. We have the annual employee dialogue for every employee where your supervisor talks to you about learning needs and opportunities. We implemented the so-called 70-20-10 rule. People realize usually 70% of their learning is on the job, 20% through interaction with others and 10% from classroom training. We want to really apply those tools throughout the career. It is never too old to learn, even if you are near retirement, there still should be some learning.

What are the most-needed skills for Grows in the early stage of our careers? Can BASF provide relevant training?

BASF's success really depends on people with different backgrounds and expertise – engineers, chemists, business people as well as Chinese, Germans, Americans and other nationalities. I remember when I started at BASF, I learned that it was really different to discuss with somebody with a business administration background, with an engineer,

“ You can learn more tools or techniques. But the most important thing is that you are open to apply these things and to collaborate with other people. ”

Dr. Lars Reichmann, Vice President, Human Resources Greater China, BASF

or with a scientist, because sometimes they speak a little bit different languages and think differently. It is quite interesting working with these different kinds of people. It's a very important skill, because people really bring different knowledge and their different strengths together to create value at BASF.

Training can provide some basics. For example you need some presentation skills and know how to prepare power point presentation; some language skills from language training. However, it is everyday feedback from your supervisor and colleagues that helps most to improve your overall skills and capabilities.

Do you have any expectations from Grow trainees?

Be open. Be curious. Develop your own ideas on how things should be. There are a lot of things to experience in the company. Find your way and try to get the support from others. You will not always have the perfect job each time. But if you look at the big picture and know where you want to go, there are a lot of opportunities. Being able to work with these different people and to embrace diversity is an important competency. ■

Academic community and the cultivation of innovative talents

By: Prof. Shen Wei



“The close Cooperation between universities and innovation-oriented enterprises helps to improve innovative awareness and action of talents, broadening their horizon.”

Prof. Shen Wei, Deputy Secretary of CPC Committee, East China University of Science and Technology

The concept of “Academic Community” was put forward by British philosopher Polanyi in the 20th Century, who deemed all scientists engaged in scientific research as a social group with common beliefs, values and norms. Colleges and universities, as cradles of talent and research institutions of various subjects, constitute the cornerstone of academic community. Enterprises, in contrast, understand market needs and lead innovative solutions, bringing momentum to this group.

In addition to a mission of scientific and technical innovation, the academic

The close cooperation between universities and companies is playing a key role in the cultivation of innovative talents. Prof. Shen Wei from East China University of Science and Technology and Dr. Ma Lian from BASF shared their viewpoints here.

community has played a critical role in nurturing innovation talents. The close cooperation between universities and innovation-oriented enterprises helps to improve innovative awareness of talents, broadening their horizon.

Innovation-oriented education is deeply integrated in the curriculum and extra-curricular activities at East China University of Science and Technology (ECUST). The school, in Shanghai's Xuhui District, features 19 lab buildings which are more than twice as classroom buildings with an aim of encouraging students to become involved in engineering training and operations.

Each year, the University Student Research Program (USRP) launches more than 500 extra-curricular research plans in which more than 2,000 juniors are engaged in practical research under the guidance of their instructors. Many of the results from the program are turned into innovative products and solutions. The Excellent Engineer Program also provides great opportunities for undergraduates and postgraduates to participate in external study and practice, in which they will be required to complete their dissertations at enterprises.

Both programs aim to nurture innovative and practical engineering talents. Over the years, the conversion rate of scientific achievements at ECUST is more than 50%, one of the highest among universities in China.

For more than a decade, innovative and socially responsible enterprises have been vigorously supporting the school in talent cultivation, BASF among them. Since the establishment of its first ECUST scholarship in

1997, BASF has witnessed the development of the school's scientific research capacity and the growth in innovative talents. Just over 400 undergraduates and postgraduates have received BASF scholarships, with 24 students invited to the BASF Greater China Industry Summer Course to experience the Verbund concept in person. This year, Dr. Grigorous Kolios from BASF opened at the School of Chemical Engineering “Renewable Fixed Bed Reactor” course for postgraduate students. He placed great emphasis on safety regulations overlooked in standard university courses, helping to improve the safety awareness of our students.

With such frequent exchanges, BASF scientists have not only brought innovation concepts to our students and teachers, but also helped them understand the significance of chemistry in the development of human race and future life, that the momentum of today's research is derived from future needs. The diversified information and viewpoints from the enterprise has made the university truly inclusive and inspiring.

Nowadays, mobile phones offer a convenient way to connect university professors, enterprise R&D leaders and institutional scientists. For example, we often discuss research subjects and seek Cooperation in WeChat groups. Emerging media not only facilitates communication in the academic community but also creates many innovative ways of Cooperation, helping to motivate and inspire students and teachers in research and innovation. ■

Prof. Shen Wei is Deputy Secretary of CPC Committee, East China University of Science and Technology

Inspiring new thoughts in chemistry

By: Dr. Ma Lian

For many years BASF has been committed to supporting the scientific research in China. We encourage young scholars to make breakthroughs and innovations in their own fields, aiming to create chemistry for a sustainable future, and make a better world with Chemistry.

BASF has been involved in over 200 bi- or multi-lateral scientific research programs with Chinese colleges and research institutes, covering extensive sectors including advanced materials, nano-technology, organic compounding, industrial catalysts, industrial bio-technology, plant bio-technology and chemical engineering. Over 50 papers have been published on distinguished journals. These collaborations not only help BASF to extend the width and depth of R&D, but also enable scientists to get familiar with market trends and challenges while solving scientific problems.

In addition to scientific cooperation, BASF also supports the scientific development of China through hosting, co-hosting and sponsoring local and international conferences. For instance, in 2013 BASF and Chinese Academy of Science jointly hosted CAS – BASF FormulAsia 2013 to discuss about the application of Nano structural materials and formulating technologies in electronic and energy fields, aiming to promote the commercialization of research findings.

Meanwhile, BASF also provides young scientists with opportunities to catch up with the latest industry trends. So far nearly 30 young scientists from China have participated the annual “BASF Insights” event in Ludwigshafen, Germany, headquarters of

BASF SE. They were also able to exchange ideas and address industrial challenges with both BASF scientists and external experts from all over the world. Besides, we collaborated with Chinese Chemical Society and set up the Youth Innovation Prize in 2001 to recognize and encourage outstanding young scientists in their innovative research. So far, 24 distinguished young scientists have been awarded.

As a corporate citizen, we also find ourselves responsible for the nurturing and development of innovative talents with universities. We not only support outstanding students with scholarship, but also provide internships and many kinds of courses to help them understand innovations in the chemical industry, as well as the principles of Responsible Care and sustainability. For instance, 35 PhDs from universities and research institutes in Greater China, including Taiwan and Hong Kong, were invited to BASF Research Forum Asia Pacific & the Third BASF Excellent PhD Prize to connect with BASF scientists, experience global economic and technical challenges and learn innovative expertise and experiences.

Innovation enables future development. As the leading chemical company, BASF is committed to driving innovative solutions with considerable investment in research and development. Meanwhile, we will continue to support young chemists in their innovative research and deepen our cooperation with the scientific community in China to create chemistry for a sustainable future. ■

Dr. Ma Lian is Director of Science Relations and Innovation Management Greater China, BASF



“We will continue to support young chemists in their innovative research and deepen our cooperation with the scientific community in China to create chemistry for a sustainable future.”

Dr. Ma Lian, Director of Science Relations and Innovation Management Greater China, BASF



36 students participated BASF Industry Summer Course in 2013.

Little scientist at BASF Kids' Lab

By: Dou Haotian



Ten years ago, Dou was one of the kids doing experiments at BASF Kids' Lab.



This year, Dou was one of the voluntary instructors at BASF Kids' Lab in Chongqing.

For more than a decade, BASF has engaged over 135,000 kids across Greater China in the magical world of chemistry through its interactive chemistry laboratory, BASF Kids' Lab. Mentored by well-trained voluntary instructors, kids learn in a fun way about how chemistry can benefit the environment and contribute to a better future. Author Haotian Dou is one of the volunteers at the Kids' Lab this year.



I was born in the residential area of Yangtze Petrochemical Company, and my father worked in the chemical industry. That's probably why I have an affinity with chemistry. My first encounter with this fascinating subject came 10 years ago at BASF Kids' Lab, where the hands-on experience in some interesting experiments enabled me to get a glimpse into the magical world of chemistry. Despite fading childhood memories as time passes by, I still keep the red apron in my room as my aspiration for chemistry began to grow.

Now I am a freshman of Chemical Engineering and Process Major. This summer, I was excited to learn that the BASF Kids' Lab was coming to Chongqing for the first time. I immediately applied to become a student helper. Coming back to the Kids'

Lab, I felt a sense of belonging immediately when I saw the familiar aprons and the lovely Dr. Bubble. The BASF Kids' Lab definitely made a profound impact in my life.

This summer's Kids' Lab also provided me with an excellent opportunity to meet some like-minded friends enthusiastic about the chemical world. In this one-week event, we experienced the challenge in facing scores of kids and their parents, got exhausted when running the campaign under the sun, and became delighted to see the kids and parents leave with satisfaction. We were happy to witness the fully packed sessions. Looking back, I could still feel the happiness and sincerity. I was very proud to be a part of Kids' Lab when I saw the impressed young participants and their approving parents.

As one of my fellow student helpers said, "10 days would be enough to change one man's life." In 10 days, we not only had an internship experience, but more importantly earned each other's friendship. Coming from different cities, universities and majors, the 15 student helpers constituted a united team with strong resolve and action. We set a goal for this year's Lab: "To build a brand and have good start." With our hard work, I believe that we not only achieved this goal but also set a new one for our own life.

These experiments successfully aroused the interests of many kids and made them ask for more. Therefore, I hope the BASF Kids' Lab would provide more interesting experiments for them next year when I will again put up my apron and goggles to help them explore the magical world of chemistry. ■

Making "wow" love "why"



Do you know kids' most popular reaction to chemistry? It's "Wow!" One simple word with great scientific experience behind it.

At BASF Kids' Lab this year, kids from Shanghai, Beijing and Chongqing became scientists. They experiment in a playful manner and learn why and how the world's marvels work.



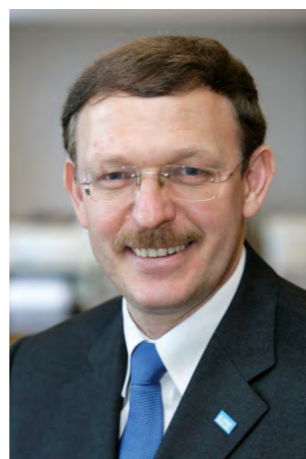
Children were making their own sunscreen lotion by mixing various ingredients and learning how the finished mixture can filter UV light penetration by using a UV detector. This experiment helps to raise kids' awareness of the potential for skin damage caused by UV light, and the importance of sun protection.

Basics about Emergency Response

By: Rolf Haselhorst

People visiting BASF sites are often impressed by the company's on-site firefighting brigades. They are often stationed in two-storeyed buildings by a site's main entrance. Inside the massive metallic door are eye-catching red, gleaming firefighting vehicles, protective equipment and firefighters in military-green sweaters. They are often doing physical exercises, akin to a TV drama-like scene, something that is usually the extent of what most people know about emergency response.

Rolf Haselhorst, Vice President and Head of Fire Department, BASF SE, was invited to Shanghai Disaster Reduction Forum in October to share the best emergency response practices of the company. He was the sole expert among multinational chemical companies invited to the forum. In this issue of *BASF information*, Haselhorst introduces the ABCs of Emergency Response.



Emergency Response

Emergency response, as one of the Responsible Care Management System Codes, aims to ensure BASF makes proper preparations for any possible incidents within the product supply chain, from production to storage and transportation. BASF implements emergency response strategies in all its plants and sites worldwide. Our work involves development of fire-protection plans, regular on-site firefighting drills and employee training, in addition to firefighting simulations in case of emergency events and disasters.

Awareness

BASF Emergency Response Management System is closely bound to our companies, customers, neighborhood and communities wherever we operate. The safety and disaster prevention awareness of everyone, especially our employees, is of critical importance to the success of our programs. Every one of us is obliged to inform the related departments when accidents or potential risks are identified; this is the prerequisite for our expert team to carry out their work.

A hazard prevention system can only be effective when employees are committed to it. Therefore, safety training for ordinary employees is organized annually at BASF covering basic skills, first aid and fire

extinguishing. Accident-response team members are required to take additional training in crisis management. We also conduct firefighting drills at sites on a regular basis to ensure every employee knows what to do in case of emergency.

Best team

Emergency Response Management Systems have been deployed at all major BASF sites, and related teams have established a close collaboration at the national and regional level. With the coordination of BASF Fire Department in Germany, firefighting departments worldwide have formed an extensive and highly effective network in which expertise and experiences are shared.

From fire prevention to hazard prevention, the changing role of the BASF Fire Protection Department places enormous demands on the professional qualification of employees: They must be familiar with hazard prevention and management expertise related with chemical leakage, in addition to fire extinguishing.

Collaboration

Closer collaboration between government and enterprises will contribute to better management of emergency incidents,

especially in traffic accidents. As one of the major sponsors of Transport Accident Information and Emergency Response System, BASF, together with other member companies of German Chemical Industry Association, is providing chemical-related road accident rescue and consultation in 11 regions of Germany.

In China, BASF has deployed off-site emergency response systems between major sites. Once BASF product-related accidents are identified, the nearby BASF Emergency Response Teams will provide timely support once informed to reduce accident-handling time, damage and loss.

With abundant expertise and advanced rescue equipment, BASF is committed to becoming an integral part of China's emergency response network in close cooperation with government and other players in the chemical industry.

Vehicles

BASF currently owns 40 firefighting vehicles of different purposes, including turbo extinguisher with a firing range of nearly 150 meters, remote-controlled robotic vehicles and hazmat trucks equipped with special gear.



(Upper) There is a special hazmat truck stationed at the Caojing site. In addition to five BASF plants in the Caojing site, it also serves the entire chemical park covering 29.4 square kilometers under direction from the fire department in Shanghai Chemical Industry Park.

(Lower) In Germany, BASF has a turbo extinguisher with a firing range of nearly 150 meters.

There is a special hazmat truck stationed at the Caojing site in Shanghai. In addition to a larger body than ordinary fire extinguishers, it is unique because of the on-board special rescue equipment and supplies for chemical incidents, which are equipped in line with properties of chemicals. Besides five BASF plants in the Caojing site, it also serves the entire chemical park covering 29.4 square kilometers under direction from the fire department in Shanghai Chemical Industry Park. ■



Responsible Care

Responsible Care is the chemical industry's global voluntary initiative under which companies work together to improve their performance in the field of environment, health and safety and to communicate with stakeholders about their products and processes.

BASF co-initiated the Responsible Care Global Charter in 2006. In 2007, we launched our own Responsible Care management system which has since formed the basis for all our environment, health and safety activities. BASF implements Responsible Care principles in daily management and continuously improve its safety performances.

Responsible Care Codes include:

- Community Awareness and Emergency Response
- Distribution Safety
- Pollution Prevention
- Process Safety
- Occupational Health and Safety
- Product Stewardship



Small beads for long distances

New BASF foam Infinergy™ revolutionizes adidas running shoe



- A more comfortable jog: Unique foamed material delivers spring and cushioning properties.
- High rebound effect: Special air cell structure of welded foam beads returns energy to a great extent.
- Light and flexible: Expanded thermoplastic polyurethane opens up new applications.

The world is on the move. To keep physically fit, more and more people jog for miles, across fields and along roadways. You can go running just about anywhere. All you need is comfortable apparel and a pair of running shoes. The global sports equipment industry is profiting from an increased enthusiasm for running: Worldwide, runners spend an estimated €15 billion on their equipment.

Customers place top priority on good footwear. Even people who only go jogging occasionally now look for lightweight soles that provide optimal shock absorption and enhanced running comfort.

Today's sports shoes are genuine high-tech products compared to previous versions: The many different materials used to manufacture

the shoes make them lightweight and stable. These materials enable the shoes to be tailored precisely to suite the style of running, the customer's expectations and the various running disciplines. All this can be confirmed with a look around the development laboratories of sports shoe manufacturers: Test subjects run over sensitive pressure measuring plates which analyze and evaluate

every step. High-speed cameras film the movement patterns and the heel-to-toe motion of the feet in the tiniest detail. All this information goes into the subsequent shoe design, which enables athletes to achieve new personal bests – and also offers recreational runners optimal running conditions.

Manufacturers are permanently on the lookout for cutting edge technologies and innovative materials. adidas is also constantly further developing its running shoes. The company, headquartered in Herzogenaurach, Germany, has been supported by BASF materials experts for more than 20 years. Using BASF's new foam Infinergy™, adidas has now developed the Energy Boost, a thoroughly new running shoe with unique spring and cushioning properties. Its outstanding feature is the midsole, the central element of every running shoe. It is made from a new particle foam which absorbs the shock impact on the foot during jogging, while simultaneously cushioning the foot. The high rebound effect of the material provides the runner with an energy return not offered by any other running shoe.

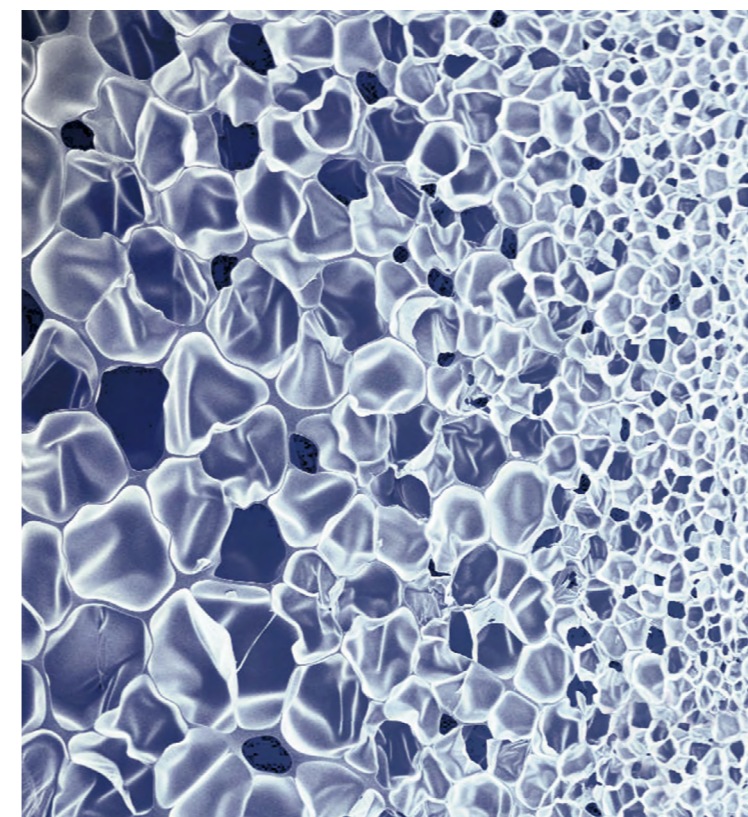
Infinergy is made of expanded thermoplastic polyurethane, in short E-TPU. "E-TPU is manufactured by foaming the starting material, TPU granules," explains Dr. Uwe Keppeler, material and process developer at BASF. "After pretreatment with pressure and heat, the individual granules measuring up to five millimeters each are blown up like popcorn." In the process, its volume increases tenfold to produce oval foam beads with tiny, closed gas bubbles inside. "These sealed air cells make the lightweight foam beads very elastic and provide the desired rebound effect. The individual beads can be imagined as being like tiny footballs: The more air they contain, the better they bounce and rebound back," says BASF research scientist Dr. Frank Prissok.

2,500 foam beads in one shoe

For every midsole, adidas needs about 2,500 of these small beads. To convert them into the desired form, they are treated with hot steam, a process in which the outermost layer of the beads melts slightly, causing them to bond into a stable shape. The internal air cell structure remains unaffected by this process.

A midsole made from Infinergy can be compressed to an extreme degree: by about half of its volume at a pressure of two bar. This property is particularly effective in absorbing the shock impact on the foot. As soon as the compressive impulse subsides, the foam returns to its original shape at lightning speed. The sole therefore absorbs the runner's energy, but then returns a large amount to the runner. This rebound elasticity of the individual Infinergy beads literally transforms the running shoes into energy stores: "When the foot is pushed off the ground, the force expended is largely returned to the athlete. This results in completely new and improved running behavior. Many runners have told us that the shoe feels like it is almost alive," explains Gerd Manz, Senior Innovation Director Global Brands at adidas. Another advantage of BASF's specialty foam: It's not only lightweight, but it also remains elastic over a wide temperature range. The particles make sure that the Energy Boost shoe also retains its positive properties at minus 20 degrees Celsius. "The running characteristics are therefore the same at frosty temperatures as at summerlike 30 degrees Celsius," says Manz.

Cross section of a single foam bead: The scanning electron microscope image shows tiny air bubbles (measuring 30 to 300 microns) enclosed in the BASF plastic.



Rebound effect material: 2,500 Infinergy foam beads form the midsole of the new running shoe.





47,000

The New York Marathon attracted 47000 participants in 2011. This was the highest number of entries ever recorded.

444

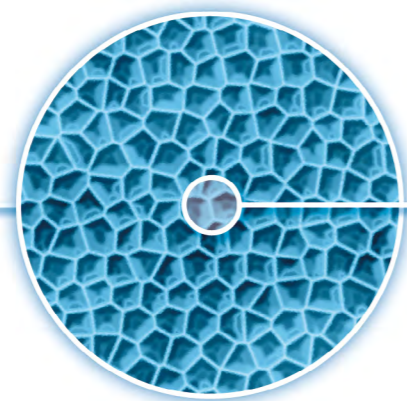
In 2012, the Germans spent €444 million on running shoes – about 30 percent more than in 2008.

50

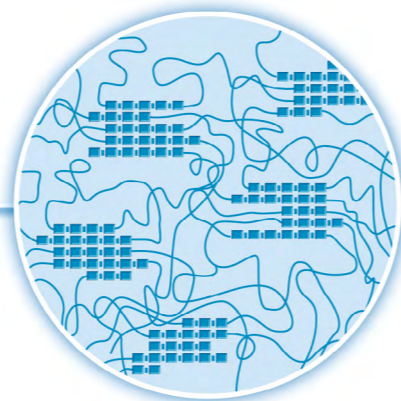
About 50 different components go into making a single running shoe. Sophisticated combinations of materials make them genuine high-tech products.



Midsole of five to ten millimeter fused foam beads made of Infinergy



Cross section of foam bead with air bubbles measuring 30 to 300 microns



Molecular structure of the expanded thermoplastic polyurethane with stiff and elastic elements

Material for unpuncturable tires

Very lightweight and elastic - these special properties make Infinergy a material with a wide range of applications.

Some of these are currently in the trial phase. Others may still be a long way off, but are certainly feasible: in the future, BASF's foam could, for example, make the "flat-less" bicycle tire that many cyclists are dreaming of become a reality. Infinergy is also potentially suitable as flooring for running tracks. For the automotive industry manufacturers, who are always searching for lightweight and robust materials, BASF's specialty foam could also open up completely new opportunities.

A bed for cows

Cows like soft surfaces - and the more often and longer the animals lie down, the better the milk. Ruminants should rest for at least

12 hours, since the blood supply to the udder is optimal during their resting period – which increases milk production. Cows are also picky creatures and won't lie down on just any surface. Cows' mattresses made of the innovative particle foam Infinergy are not only soft, but also extremely tough and remain elastic even after prolonged use. BASF's new plastic combines both properties for the first time. The mats have already passed the loading test performed by the German Agricultural Society (DLG) in which they were loaded 100,000 times with a weight of one metric ton. Practical tests are now underway in a trial cowshed of the DLG.

Buffer zone in the children's jungle

Crossing rivers on wobbling stones, balancing over suspended bridges and traversing ravines. Children with rheumatic diseases can once again experience spectacular

adventure sports in less hazardous terrain: at the Movement Park of the Rheumatism Clinic for Children in Garmisch-Partenkirchen, Germany, opened in the fall of 2012 in cooperation with the Munich company Innovationsmanufaktur. Here, the young patients can again have fun with sports and movement. Studies have shown that rheumatism and sport are not mutually exclusive - on the contrary, targeted training can promote the physical fitness. Particularly important, however, is that the children's joints should not be overstrained. This is why a well cushioned floor and soft elements play a major role. BASF's novel material Infinergy provides optimal properties for the "jungle zone" of the Movement Park. With its good rebound characteristics, the floor can soften falls very effectively. The material is also very weather resistant and tough - making it ideal for outdoor applications. ■

Find out more

If you would like to know more about the topics covered in this issue of *BASF information*, please use the following links.



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Thank you for taking the time to read this publication. We welcome your opinions and feedback, and would appreciate your response to our short reader questionnaire.

Simply fill out the questionnaire **here** and be entered in a draw to win a pair of adidas Energy Boost running shoes.



Prize draw terms and conditions:

On submitting a completed entry, you will automatically be entered into a draw for this prize. The winner will be notified by e-mail within 28 days of the closing date. The closing date for entries is February 18, 2014. The competition is not open to employees of BASF or participating companies. No cash alternative will be offered. No responsibility can be accepted for entries lost, delayed or mislaid. Entry in the prize draw is restricted to entrants of 18 years of age or over. BASF's decision is final and it is a condition of entry to any competition that the entrant agrees to be bound by these rules.

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The cover photo was shot at a banana base in Guangxi province in China.