

ACHEMA

Worldwide News

2|2013

ACHEMA
2015

Frankfurt am Main,
June 15–19, 2015
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A special edition from

PRO·CESS
Chemie · Pharma · Verfahrenstechnik

2013

OFF TO NEW HORIZONS

The process industries have, on a global scale, more than just one region of pronounced strategic interest. This includes the emerging BRIC states — Brazil, Russia, India and China — and extends from North America with its recent shale gas boom to Europe which is by no means written off. Another area of key interest is the Gulf region. Rich fossil resources and easily accessible energy have made the Gulf countries, particularly Saudi Arabia, predestined for large scale chemical production.



■ **DR. THOMAS SCHEURING**
CEO DECHEMA Ausstellungs-GmbH ■

The current development strategy of local governments in the Middle East who are investing in refining and downstream processing to expand the domestic value added chain has drawn further interest to the Gulf region. Hence the Arabian Peninsula has become a prime destination for technology suppliers to the chemical sector.

Yet the story continues: The shale gas boom in the US will put Middle East industries under pressure to enhance profitable efficiency and competitiveness. This is impossible without state-of-the-art technology — which means the Gulf region offers even more chances for technology suppliers. Or, in other words: Vast opportunities for the majority of our ACHEMA exhibitors.

But it's not only about fossil resources. The Arabian Peninsula has an abundance of solar energy and a dramatic lack of fresh water. The combination of these three factors — fossil resources, solar energy, and water shortage — brings a unique mix of challenges and opportunities to the process industry. A regional forum where these issues can be addressed specifically should have all the success chances one could ask for.

While we see a good number of attendees from the Gulf at our main event in Frankfurt every three years at ACHEMA, it is overdue to offer our customers an additional platform in the region where they can initiate contacts or refresh existing ones. A platform where the typical, mid-sized ACHEMA exhibitor who doesn't possess an own local subsidiary can display his technological competence to a regional audience. At this point the idea of an ACHEMA Middle East came into play, and while we have not yet finished all our homework we can already say now: It will be ACHEMA time in the Middle East in the not too distant future.

Stay tuned — we will come up with some exciting details real soon.

“It will be ACHEMA time in the Middle East in the not too distant future.”

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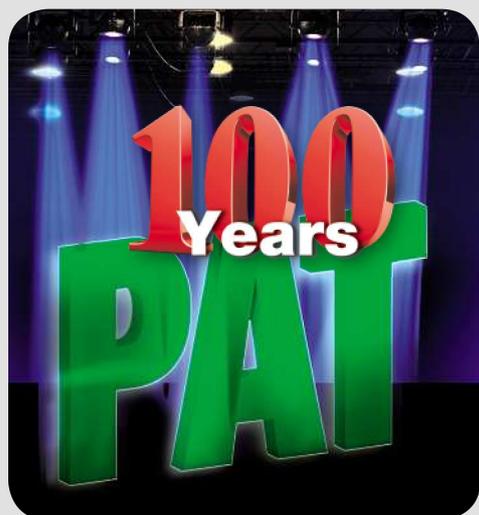
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SUCCESS ALL ALONG

THE LINE

AchemAsia — firmly established as top event for China's process industry

With 418 exhibitors from 23 countries and 12,470 visitors, the 9th AchemAsia closed its doors on May 16 earlier this year. Exhibitors and organizers were highly pleased with AchemAsia 2013, as this year's event without doubt was the smoothest AchemAsia ever. After having concluded the exhibition in 2013, it is safe to say that AchemAsia is firmly established as the undisputed top-event for China's chemical process industry.

For the first time, more than 50% of the exhibitors came from the PR China. While this is partly due to the fact that more and more international companies are represented by regional subsidiaries, it gives also proof to the fact that attending AchemAsia has become mandatory for the major players in our industry.

The atmosphere among the exhibitors was unanimously positive as the high visitor numbers — exactly at the level of the previous event — were reflected by plenty of inspiring discussions and new contacts made at the stands.

Well-Received Conference Layout

The new conference layout with a cluster of satellite symposia was especially well received. These satellite symposia which had been organized by domestic as well as international partners were mostly filled to capacity, whereby in some cases even the seats available were not sufficient to accommodate all attendees. Typical highlights were resources for the substitution of petroleum, environmental technology, water treatment, and separation technologies. Other events such as the exhibitors' presentations also received very positive feedback.

Source: DECHEMA e.V.

A special edition from **PROCESS**



Picture: DECHEMA

In his speech at the opening ceremony Prof. Li Yongwu, Chairman of the China Petroleum and Chemical Industry Association and President of DECHEMA's co-organizer CIESC pointed out the necessity of a sustainable industry with a focus on energy efficiency and recycling.

In his speech at the opening ceremony Prof. Li Yongwu, Chairman of the China Petroleum and Chemical Industry Association and President of DECHEMA's co-organizer CIESC, emphasized the importance of AchemAsia for international cooperation. He also pointed out the necessity of a sustainable industry with a focus on energy efficiency and recycling.

Prof. Yang Yuan Yi, Secretary General and Vice President of CIESC, highlighted the progress China's industry has already achieved on the route towards sustainability. Examples are the Zhenhai refinery as one of the most energy-efficient facilities worldwide, or the current efforts towards sulphur-reduced gasoline, as well as coal power plants that have been fitted with carbon capture and storage technology.

The fact that China is actively addressing its environmental challenges became also apparent in the exhibition. Apart from process technology, plant engineering and pharmaceutical technology, many companies offering environmental technology and water treatment were present.

Food processing, agrochemistry and biotechnology were further important topics, indicating the increasing importance of the life sciences sector.

Overall, 418 exhibitors from 23 countries displayed their technology and products on 6,500 m². After China with 240 exhibitors, the largest groups came from Germany (90) and France (17).

AchemAsia takes place triennially as an exhibition accompanied by several satellite symposia, jointly organized by DECHEMA and CIESC (Chemical Industry and Engineering Society of China) in cooperation with numerous Chinese and international partners. ■

Save the Next Date

AchemAsia 2016, May 9–12, 2016
China National Convention Center,
Beijing

ACHEMA 2015 — CHANGE AND CONSISTENCY IN BALANCE



Pictures: DECHEMA/Heimut Stettin

View inside of Hall 8

After the massive changes we saw at Achema 2012, consistency is the name of the game for the next edition.

DR. THOMAS SCHEURING

This refers particularly to the overall hall layout. Hence we will see only minor changes in hall allocation after the substantial rearrangement of exhibition groups which was triggered by newly available facilities last time. So except some minor modifications the hall allocation will remain unchanged for 2015. The same holds true for most of Achema's key elements like the general conference layout, the well-proven international marketing and promotion campaign, and the networking with partner associations from all over the world, not to forget the finely-tuned organizational teamwork which happens more or less invisible in the background.

Not surprisingly organizational preparations are already in full swing by now, after application documents had been

dispatched in September and the exhibitor registration is open since then. And — highly appreciated and very pleasant — demand is huge, with exhibitor registrations flowing in like a steady stream.

You cannot successfully stage the industry's trend-setting event on the long run without at least partially re-inventing yourself with each new edition. So here comes, in a very brief overview, what's new in 2015.

We had to realize that Achema's conference and social program has become too big over the years. Too much topical overlap between conference sessions, too many events where none of the attendees had the chance to participate in more than only a handful. The answer is: Achema 2015 will see a much more compact conference program, and we

Save the Date

Next ACHEMA:
June 15–19, 2015
Frankfurt am Main/Germany
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exhibitors:
Tel. +49-69-7564-423
Visit, Travel Information:
Tel. + 49-69-7564-249
Congress: Tel. +49-69-7564-254
www.achema.de



have streamlined the social events as well.

The ACHEMA 2015 conference will in general have a higher practical orientation, with more reference to the industry's actual needs. Apologies already at this point to lecturers whom we might be unable to assign a lecture slot due to the lack of practical impact of their intended presentation.

Parts of the new conference program will move closer to the exhibition halls, i.e. the area where the respective audience is already meeting exhibitors they are interested in.

We will discontinue our previous approach of a special show dedicated to just one topic. Instead, we have defined three focal topics which emphasize cross-disciplinary interaction, thus triggering a panoply of new ideas and innovations. These are:

- **BiobasedWorld at ACHEMA:** The meeting point for industrial (“white”) biotechnology will continue to attract attendees from all fields of the life sciences (see page 10).
- **Innovative Process Analytical Technology (PAT):** The link between automation and analytics which enables automation suppliers to actually revolutionize chemical production (see page 12).
- **Industrial Water Management:** Concepts for ecologically and economically efficient management of industrial water cycles — crucial for operating chemical plants (see page 8).

These topics will form a prominent part of ACHEMA's high-profile congress programme, together with many more. All of this will, through lectures or overviews on topical themes, panel discussions, expert round tables, top-class guest events and symposia, draw an up-to-date picture of what is going on in our industry.

We had to accept that those exhibitors within the instrumentation group who were placed in the mezzanine level of hall 11 were quite unhappy last time. Through some adjustments we will be able to accommodate them inside hall 11, together with all other exhibitors offering automation technology and measuring or control devices.

We will, together with the charity “BusinessAngels RheinMain”, award the best young entrepreneurs in our field through the newly donated “ACHEMA Founders' Award”. This accolade is dedicated to new technological concepts, presumably just in its infancy mostly, and is meant as a stepping stone for these entrepreneurs to raise awareness of potential investors.

As you all know, early summer in Germany—the time ACHEMA takes place—can already see some very warm days. So it is not rare that, with all the heat intake through humans as well as exhibits in operation, but particularly also the massive illumination on many booths, the halls' air condition gets to its limits — or beyond.

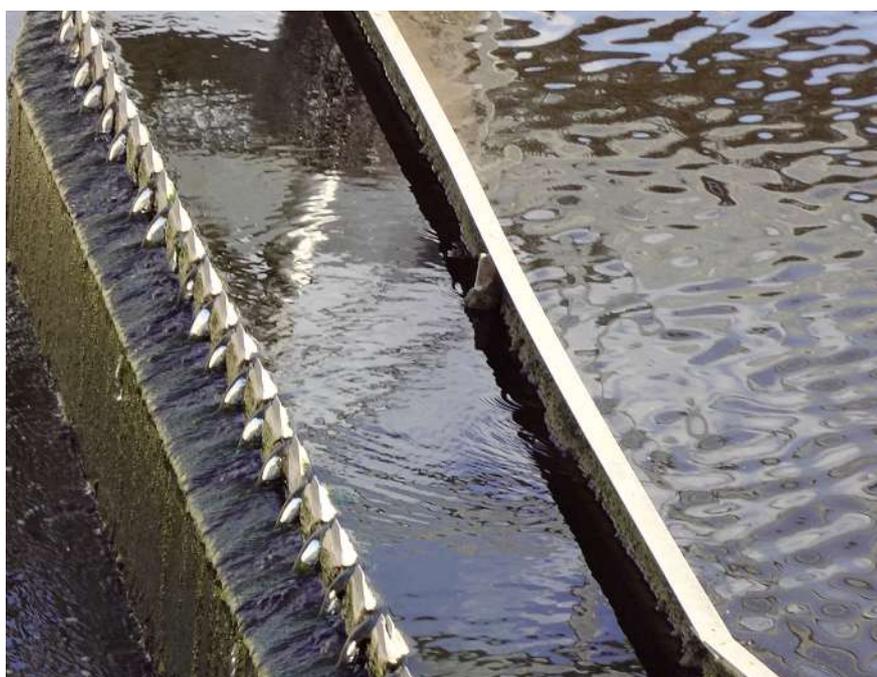
To reduce that heat intake in the exhibition we came out with our new “Cool Light Initiative” where we want to encourage exhibitors and stand constructors to use as much innovative heat-reduced lighting as possible. Current progress in LED systems offers vast opportunities to achieve the same illumination effects, if not better ones, than with the old-fashion halogen spots.

So while all of the above is supposed to sustain and gradually improve the quality of ACHEMA it goes without saying that we as organizers will spare no efforts to maintain ACHEMA's standing as what it always has been: The culmination point of our industry! ■

EVERY DROP COUNTS

How to integrate efficient water management in industrial production?

DR. THOMAS TRACK



Picture: DECHEMA/Track

The process industry has two answers to this question: One from the point of view as large industrial water consumer and one from that as solution provider: Chemistry and engineering provide technologies and solutions for efficient water treatment and water use that can be applied in a broad range of industries such as mining, industrial biotechnology, health, food, electronics, pulp and paper, and energy.

Available solutions are manifold and depend on specific requirements of industry as well as the regional framework such as: availability of water resources, other users (industrial, municipal and agriculture), regulatory demands etc.

Today process industry and public supply mainly rely on the same fresh water resources. After its use process water is treated and released into the environment. Concentrates and residues are mainly incinerated or deposited. Capacities for recycling or reuse of water, its energy content and valuables or raw ma-

terials contained are by far not fully exploited.

European projects such as “E4Water” take a new approach. Their goal is to create water loop interfaces and synergies both within industry and with urban and agricultural water management systems. By linking water and production processes, the overall industrial water demand is reduced, valuables are recovered and industrial and municipal water treatment capacities are optimized.

A Holistic View:

Integrated Water Management

Water recycling and reuse is worthwhile when pollutants can be removed at reasonable cost and with minimal effort. Water recycling is less efficient for wastewater streams that are highly contaminated and contain substances with a very diverse range of chemical and physical properties. The basic prerequisite for water recycling and reuse, therefore, is the establishment of an efficient water management system to separate process water streams that readily lends itself to recycling from water streams that are less suitable.

Optimization of material streams is a highly complex task. Process and product implications, impact on energy and personal resources, and the economic context must all be taken into consideration. Because production-integrated water management involves considerable efforts, retrofitting existing treatment plants is normally not cost efficient. However, for extension projects or new installations engineering can incorporate these aspects right from the beginning, giving investors the prospect of saving considerable amounts of energy, water and operational costs over the long term. Recovery of high-value substances also becomes far easier, and reducing emissions at the source lowers post-treatment costs.

Industrial Water Management at ACHEMA 2015

Efficient Industrial Water Management is one of the most tangible and fastest-growing economic challenges faced today. As it provides a high potential for process industries it is at the top of the agenda worldwide and one of the focus topics of ACHEMA 2015. Whether it is water efficient low-emission production or zero liquid discharge, it is no longer just a matter of putting a filter on a wastewater pipe. Instead, developments are targeting concepts for cost- and energy-efficient integrated water management. The key issues are water efficient production including recycling and reuse, recovery of energy, resources and valuable products, the handling of concentrates, and the planning and management of water and material flows. These concerns are driving process engineers and materials scientists no less than chemists, system designers and control experts. New production processes and fast-growing industries, such as industrial biotechnology, engender new challenges which, in turn, place new demands on industrial water engineering.

T. Track, DECHEMA e.V.

In contrast to a fully integrated design, additive approaches involve additional downstream process stages. A seamless transition between additive and integrated design has been successfully implemented at a number of plants. For example, hot nanofiltration has been installed directly after a dyeing or washing process, thus water can be recycled and less energy is consumed. Other examples include an ion exchanger to treat rinse water in finishing operations or membrane filtration for water recycling in the food & beverage industry. Most of these internal recycling processes are located at or near the source where the complexity of water streams is low and additive techniques can be deployed with minimal efforts and expenses.

Low Emission vs. Zero Liquid Discharge

In addition to process design, there are two fundamentally different approaches in industrial water management depending on the availability of fresh water. The first one has in principle been taken for years by the German industry: in low-emission production, fresh water is fed into the plant and used as solvent, heat carrier or reagent. In the end, it is cleaned to a very high quality and released to the environment. Handling residues and concentrates, energy costs and maintenance efforts are key factors for the efficiency of this approach.

Companies in regions with high water stress increasingly follow an alternative approach. If the problem of water supply becomes too pressing, it is often preferable to keep as much water as possible in the process. The ultimate goal: zero liquid discharge. Ideally, process water is treated within the plant and circulated. In some regions with high water stress, e.g. in Asia, zero liquid discharge is a regulatory requirement. The dilemma of this approach is the excessive increase of costs for water treatment and residue handling when moving towards

a “real zero”. Due to the increasing use of modern technologies, concentrates are generated in both cases. Components such as inorganic salts or hardly degradable organics are removed, and accumulate as highly concentrated residues e.g. in membrane devices or when ion exchangers are rinsed. This used to be a problem because residues had to be incinerated or deposited at high cost. Following an integrated industrial water management approach, those concentrates can be attractive sources for raw

materials such as salts or metals, thus extending the formerly limited options for water reuse. This new way of thinking is reflected in a number of R&D activities and technology developments. In order to put these emerging potentials into effect, integrated industrial water management together with an intelligent handling of concentrates, their treatment and the recovery of as many valuable content as possible has to be at the core of further initiatives. Process industry is in a perfect position to elaborate gainful solutions. ■

THE GOOD INTO THE POT, THE BAD INTO THE FERMENTER

A diverse and balanced diet is the key to health and well-being – and it offers chances for the bio-based economy: Residue from food production covers a tremendous range of ingredients that could be attractive for further processing.

DR. KATHRIN RÜBBERDT

It sounds like a perfect win-win-situation: To overcome the food vs. feed-stock dilemma, why not use the residues of food production that are by definition not edible as a raw material base for bioprocessing? Logistics are already established, the question of waste disposal is solved, and the quantities discussed are quite impressive – according to a recent study funded by the German Federal Ministry of Food, Agriculture and Consumer Protection, biogenic residues in the German food and biotech industry amount to 13.8 mio TPY. In relation to the estimated 2.7 mio t of biomass used in the German chemical industry in 2011, there seems to be tremendous potential.

However, the initial euphoria wears off a bit when one looks at the current use of these residues. The vast majority of plant biomass that arises during food production is today used for feed. As long as we are eating meat, milk and cheese, the

feed would have to be replaced if it was instead used to produce chemicals. The value chain in the feed industry is well-established and covers a broad range from large companies in the food industry to decentralized collection from restaurants and farms. Thus, according to the study, the available amount of residue is actually around 500,000 t!

Nevertheless, this represents a significant potential – and even more when not only the quantity, but the quality of this biomass is considered. The broad range of residue from fruit and vegetable peels

to the shells of crustaceans, from whey to stale bread, gives access to an inventory of literally innumerable substances and compounds. This reservoir is well-characterized and can be processed chemically or by biotechnological methods into valuable products.

The question that needs to be discussed: Which residue can be used in which way in order to achieve the highest value? The answer may be quite different depending on raw material and even on region. Some examples of high-value products have already been identified:

BiobasedWorld at ACHEMA 2015

The vision: Meet the global demand for food, feed, fuel and consumer products by using renewable resources in a sustainable way. The strategy: Develop integrated and efficient processes that make the most out of the available resources. BiobasedWorld at ACHEMA presents the tools that will help to make the vision come true: From equipment for the comminution and classification of biomass via biotechnological and chemical processing to analytical apparatus and packaging, ACHEMA offers a showcase for the complete bio-based value chain. This includes concepts and equipment for biorefineries, development and processing of bio-based products from bulk chemicals to specialties, laboratory equipment and analytics for biotechnological processes as well as new applications and products. New concepts for biocatalysis and biotechnological conversion of a wide range of raw materials will also be discussed in the exhibition and the congress. Participants will especially benefit from the exchange between the broad range of industries – equipment, food processing, chemicals, laboratory, and packaging – present at ACHEMA and relevant for the BiobasedWorld.



K. Rübberdt is Head of Biotechnology, DECHEMA e.V.

Food residue might not be the panacea to the problem of biomass availability. But it certainly opens up some very interesting perspectives.

In Asia, chitin from crustacean shells is already processed to chitosan, a biopolymer that can be used in water treatment processes and in the beverage industry. Fibers based on chitosan are investigated for the use in medicinal applications. European shell waste contains high levels of CaCO_3 that prevent the conversion to chitosan. The European project “ChiBio” deals with the processing of fishing residue into special and fine chemicals; the goal is to establish a “biorefinery” based on shells from crustaceans. ChiBio aims at producing high value products from drop-in solutions to high performance polymers by combined chemical and enzymatic methods.

Another promising concept for processing food residue relies on the remarkable abilities of fungi. At the University of Gießen, edible fungi are cultivated on a wide range of substrates including vegetable peels and residue from the production of bread or waffles. These fungi have the ability to “digest” lignocellulosic components and other ingredients of the substrates, and they secrete a range of attractive metabolites. The current focus of research lies on flavors, but scientists think there is also potential for the production of secondary metabolites with pharmaceutical activity.

DECHEMA’s Research Institute has developed a biotechnological process to convert (+)-limonene from orange peels into (+)-perillic acid. A natural substance with an antimicrobial effect, it can be used as a preservative in cosmetics and pharmacy.

Many plants contain polyphenols that remain in the pomace after pressing of oil or juice. This large substance class comprises a variety of bioactive substances such as colorants, flavors and anti-oxidants. New adsorb-

ing processes help to collect polyphenols systematically and by fraction; they can then be used as functional ingredients in food or feed.

The way from the lab to industrial application is never easy. In addition to logistics and technology, in the case of food residue processing, there is also the question of operation. Most food processing companies are not willing to install additional plants that produce glue, plastics or pharmaceutical ingredients. On the other hand it makes sense to process the biomass on site, thus avoiding qual-

ity losses during storage and transport. A current trend in process engineering might be the answer: modular and flexible plants that could be set up virtually in the backyard of the production site by an independent operator; they should be able to process a variety of feedstock depending on season and region.

Food residue might not be the panacea to the problem of biomass availability. But it certainly opens up some interesting perspectives to food producers, plant engineers and producers of bio-based products that merit further exploration. ■

A CENTENARIAN IN THE PRIME OF LIFE

Happy birthday! Process analytical technology (PAT) celebrates centenary.

ARBEITSKREIS PROZESSANALYTIK

100 years ago, on May 22nd 1913, Paul Gmelin, an employee in the physics laboratory of the Badische Anilin- und Soda-Fabrik in Ludwigshafen, Germany, filed the first patent for a process analytical instrument. The so-called pipe analyzer was developed for the metrological determination of the ratio of the gases nitrogen and hydrogen for ammonia synthesis and to control the production process.

The term PAT covers all measurement methods dealing with the determination of substance physical and chemical properties, concentrations, and compositions of process streams manufacturing. They complement the traditional but non-specific parameters; temperature, flow, level, and pressure, which are independent of the nature of the substance. In PAT, measurements are carried out

- in-line, with sensors in a tank or in a pipeline;
- on-line, with a dedicated, automated sample preparation;
- at-line, with a sequential sampling.

Currently, the field of PAT comprises more than 80 different measurement methods. These range from pH measurement, gas measurement and gas warning technology, refractometry, density, viscosity and humidity measurement, paramagnetic oxygen measurement and photometry to complex methods of chromatography and spectroscopy. The most recent methods include on-line NMR, terahertz, and diode laser spectroscopy, ultra-high pressure liquid chromatography as well as various online measurement methods in biotechnology.

The author is a combined working group of DECHEMA and the Gesellschaft Deutscher Chemiker, the German Chemical Society (GDCh).



Pictures: archives; © Jonas Wolff - Fotolia.com

Without all these various PAT methods, chemical plants, refineries, and virtually all process industry could nowadays no longer be operated economically and safely. The direct measurement of material properties, concentrations, and compositions allows for monitoring and control of production processes and facilitates optimization of production and target product quality.

The potential for value creation using PAT methods is exceptionally high. Replacing manual sampling and laboratory

analytics with PAT allows elimination of potential safety risks in sampling and sample transport as well as waiting for laboratory results. Production processes can be optimized regarding feedstock, safety and energy consumption and the product quality becomes more reproducible.

Last not least, compared to a pure recipe operation reaction progress can be measured in real time by using PAT and thus production times are reduced and unwanted by-products avoided. ■

❖ PAT at ACHEMA 2015

Process Analytical Technology (PAT) covers far more than “only” real-time measurement. PAT provides input for process optimization and automation, without which the fundamental changes in process control, such as QBD (Quality by Design), would not be possible. To exhaust all the potential, it will require the concerted efforts of many disciplines and players, ranging from laboratory and analytical techniques to instrumentation and control through to process developers and component suppliers. No better place than ACHEMA 2015 to bring all these players together in one exhibition and congress!

A PLAYER ON THE RISE

The boom of 2010 and 2011 might have cooled down, but with growth rates of 3.5 to 5% Turkey is still an economic force to be considered.

FERIT ORBAY

At first sight, the economic development of the last two years might be worrying. Growth rates have diminished significantly, and the Turkish Lira has lost about 13% of its value since the beginning of the year. The global situation is not without effect on the country that has been discussed as one of the next rising stars when “MIST” (Mexico, Indonesia, South Korea and Turkey) replaced “BRIC”. Instability in neighboring countries and protests in summer 2013 also caused some worries for investors and suppliers.

The 2010 and 2011 euphoria should, however, not be replaced by disproportionate pessimism. With a population of more than 75 million and located at the border between West and East, the country is still predestined to be a buzzing hub for trade and industry. And Turkey is not only a transit site for oil and gas pipelines from the Middle East and the Caucasus, but possesses significant resources of its own: According to the Wallstreet Journal, the Turkish proven reserves amount to 307 million barrels of oil and natural gas. Extensive exploration is under way with the goal of making Turkey independent of energy imports by 2023; however, experts are rather skeptic as to whether this target is realistic.

Increased economic independence is a general aim of the Turkish government and has led to significant investment programs. They target among others the chemical industry whose annual trade deficit is currently about US\$25 billion. A strategy document published by the government in 2012 defines the vision for the



Picture: Fotolia © daboost

chemical sector as “producing high-added value products and transforming Turkey into an investment base”. This is to be reached by fulfilling six main targets that include the creation of a political framework favorable for high added-value production, the further integration of the value chain, the adoption of new R&D policies and the education of highly-qualified personnel and a more balanced foreign trade. Even today, the chemical industry is one of the most important export sectors, accounting for about 12.6% of all exports in Turkey, and the country is one of the global leaders in the production and export of chrome and boron chemicals.

Geostrategic Advantage

Despite the ongoing and in parts tenacious negotiation with the European Union, due to its geographic location Turkey is not limited to one partner or region. This geostrategic advantage opens up tremendous development options for export of intermediary and finished goods. In addition, the population is rather young (average age 29 years) and open for new products, creating a growing domestic consumer market.

With all this in mind, it comes as no surprise that plant engineering is considered to be one of the most dynamic industries in Turkey, according to Germany Trade and Invest. Currently, about two-thirds of all equipment is imported with Germany being the most important supplier.

But Turkey is striving to strengthen local production. The most important sectors are polymer processing, food processing, and packaging. Significant investment is expected in the mid- to long-term also in large-scale plant engineering with a focus on petrochemicals and the energy sector. ■

F. Orbay, AICHEMA Delegate for Turkey.



REGISTER, RESEARCH, COOPERATE

The web-based G2C Life Sciences Platform helps to arrange cooperation from the research stage until market entry. The offering by the Association of German Biotechnology Companies (VBU) and DECHEMA is free of charge and open to research institutions, universities, organizations and companies. Notably international players and

investors can use this “showcase of German life sciences” to identify potential partners in one of the largest life science markets worldwide. G2C also lists funding opportunities, events and job vacancies.

...❖ **For further information,**
www.g2c-lifesciences.org

STRONG INTEREST IN CHEMICAL LEGISLATION WORKSHOP

With a recent workshop on “New Legislative Regulations for Chemicals in China”, held on October 21 in Frankfurt, DECHEMA obviously has hit a hot topic. More than 60 attendees gathered detailed explanations and information from behind the scenes on the administrative registration of chemicals produced in China, or imported to the country. The lectures were presented by Chinese government officials who are all playing an active role in the registration process. The workshop had been organized

by DECHEMA in cooperation with AICM, Association of International Chemical Manufacturers, and the Chemical Registration Center of the Ministry of Environmental Protection as well as the State Administration of Work Safety.

...❖ **For further information,**
workshop documentation is available through DECHEMA Ausstellungs-GmbH, attn. Ms. Sinian Huang under: sinian.huang@dechema.de
Price: € 150.–

NEW TECHNOLOGY ROADMAP WITH FOCUS ON CATALYSIS

Recently, the IEA, ICCA and DECHEMA jointly released their new roadmap that explores how the chemical industry can further amplify catalysis and other related technology advances to boost energy efficiency in its production processes. Entitled “Technology Roadmap: Energy and GHG Reductions in the Chemical Industry via Catalytic Processes”, the report looks at measures needed from the chemical industry, policy-makers, investors and academia to achieve the full potential of catalysis for high-volume processes worldwide. The report

details the potential impact of continuous improvements, best practices, emerging technologies, and breakthrough advances to cut energy use in 2050 by 13 exajoules and bring down greenhouse gas (GHG) emission rates by one gigatonne of CO₂ equivalent.

...❖ **For further information,**
contact James Pieper, ICCA, at: jpi@cefic.be

Here you will find the roadmap: www.dechema.de/industrialcatalysis

International Events Organized by DECHEMA

- **January 21–22, 2014:** 9th Status Seminar Chemical Biology, Frankfurt am Main/Germany
- **May 6–9, 2014:** EuroPACT 2014 — 3rd European Conference on Process Analytics and Control Technology, Barcelona/Spain
- **May 13–16, 2014:** EBSA 2014 — 17th Annual Conference of the European Biosafety Association, Gent/Belgium
- **May 26–28, 2014:** Biomaterials — Made in Bioreactors, Radebeul/Germany
- **June 25–27, 2014:** 3D Cell Culture 2014 — Advanced Model Systems, Applications & Enabling Technologies, Freiburg/Germany
- **September 7–11, 2014:** 20th International Solvent Extraction Conference 2014, Würzburg/Germany
- **September 8–11, 2014:** 6th International Conference of the Federation of European Zeolite Associations (FEZA)
- **September 14–17, 2014:** 10th International Conference on Distillation & Absorption 2014

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