CHEManager EUROPE

1/2007 January

THE NEWSPAPER FOR THE CHEMICAL AND LIFE SCIENCES MARKETS

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Markets and Companies

Effective mergers and acquisitions in the chemical industry

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Production

Power ultrasound in chemical processing has importance in crystallisation control

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Newsflow

Bayer's new herbicide ingredient Tembotrione has been given its first worldwide regulatory approval in Austria. The company also announced that corn herbicide Laudis, which contains Tembotrione, will be launched in Austria in time for this year's spring season. Bayer said market authorisation for Tembotrione is expected in further European countries in the course of the year.

The European Commission Monday cleared U.S. private equity groups **Advent International Corp.** and **Carlyle Group L.P.** to buy **H.C. Starck,** a chemicals unit of Germany's Bayer. The deal is worth €1.2 billion. Bayer has said the sale, including debt of about €450 million, will help pay for its €17 billion acquisition of German pharmaceutical company Schering.

ConocoPhillips and **Marathon Oil Corporation** have jointly filed for a 2-year extension of the Kenai Liquefied Natural Gas (LNG) facility's export license with the U.S. Department of Energy. The current license ends 31 March 2009 and this application would extend the export license thru 31 March 2011. The Kenai LNG facility, located in Nikiski, Alaska, is the only LNG export plant in North America.

INEOS Polyolefins will invest in excess of €150 million in its European assets over the next three years, focussed on growing and upgrading its polyolefins capacities. Polypropylene capacity expansions will take place at its facilities in Geel, Belgium and Grangemouth, Scotland.

Praxair China, a subsidiary of **Praxair,** has signed a major contract with **Jiangsu SOPO Group,** for the supply of industrial gases to SOPO's acetic acid plant. Praxair will design, build, operate, and own a state-of-the-art, large air separation unit (ASU) which is due to come on stream in 2009. The ASU will have a capacity of 3,000 t of oxygen per day. According to the company, it will be the largest single plant for sale of gas and also the largest single-train ASU to be built in Asia.

Focal Point: Life Sciences

BASF Intermediates Develops New Chemical Entities

BASF's Intermediate Operating Division, part of the company's chemicals segment, supplies more than 600 chemical intermediates for use in coatings, plastics, pharmaceuticals, textile fibres, detergents, crop protection products as well as other applications. Following three years of extensive restructuring, the division has increasingly emphasised change and innovation. This strategy has led to the expansion of the New Business Development team from 12 to 38 members over the last three years. The mission of this globe-spanning operation is to create new business opportunities by developing new products and processes for life science and industrial applications. Dr. Michael Reubold asked Dr. Frank Stein, who heads the unit's NAFTA-related activities, about the business strategy.

Dr. Frank Stein, Head of New Business Development NAFTA of BASF's Intermediate Operating Division

CHEManager Europe: Dr. Stein, you started with a small team that has grown considerably in the past three years. Generally speaking, what is the principal concept of New Business Development for chemical intermediates?

F. Stein: There is no question that innovation is one of the major keys to sustain our successful intermediates business. Our goal is to meet our customer's needs by developing new solutions that add value to our customer's business as well as for us. As soon as we have identified the right partner for a new business development, we pursue clear and transparent business models. These models are based on comprehensible guidelines but are still flexible enough to take specific customer requirements into account.

How is the unit organised for challenges confronted in North

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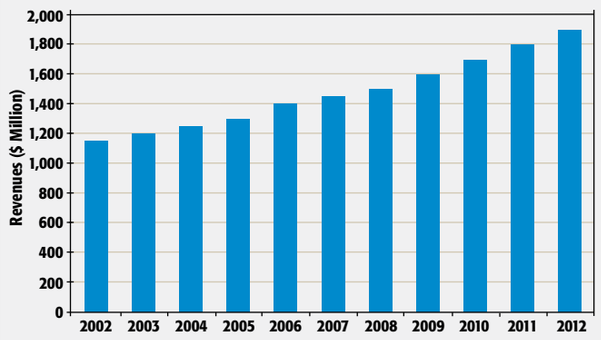
MARKET REPORT

European Water Treatment Chemicals

The European industrial water treatment chemicals market is a low-growth market. Though the chemicals have been used in the industrial sector for decades, certain key drivers provide potential for growth in the medium and long term. One of the significant drivers for potential growth opportunities in the European regions is the opening-up of the eastern European countries. Due to their economic advantage such as raw materials, lower production and labour costs, many global companies are establishing their production units in these regions. In addition to the industries the regional governments are taking

Total Industrial Water Treatment Chemicals Market: Revenue Forecasts (Europe), 2002 – 2012 Figure 1



Note: All figures are rounded.

Source: Frost & Sullivan © GIT VERLAG

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Can't Judge a Product by Its Price

Saltigo's Agrochemicals Business Puts Customers' Minds at Ease

With patents on many active ingredients running out and sluggish innovation in the field, the agrochemicals business is looking to new strategies to rejuvenate the industry. One year after Saltigo's launch as a wholly owned subsidiary of Lanxess, the company's Agrochemicals business line offers customers service and solutions. Brandi Hertig spoke to Dr. Uwe Brunk, head of the business line Agrochemicals, about the trends in the field and what he expects for the future.

Dr. Uwe Brunk, Saltigo
Head of the business line Agrochemicals

CHEManager Europe: Dr. Brunk, what challenges is the agrochemical sector currently facing?

U. Brunk: In my opinion we are facing two large challenges: On the one hand the significant loss of agrochemical companies' profitability and on the other hand the decline in the industry's innovation rate. The latter will also have a significant impact on companies' strategies, especially at the time when their bread-and-butter business goes off patent and they find themselves competing with producers of generic active ingredients. Those companies will more and more go into defending their current products with so called post patent strategies.

As far as the loss of profitability is concerned, my assumption is that many companies will consider closing down facilities or even entire sites coupled with the reduction and outsourcing of products in order to transform their fixed costs into variable costs. This is where we can help. Saltigo has 10 different plants that execute practically every technology used in the agrochemical industry. We are also used to producing active ingredients and we also have a cross-contamination prevention system in place, which has been successfully audited by almost all agrochemical companies.

What about companies with off-patent products?

U. Brunk: We are also capable of developing and implementing new syntheses for older active ingredients in our multi-purpose plants in order to reduce costs without any effect on the registration. Moreover our backward integration and sourcing networks in India and China are beneficial and helpful in reducing the costs of raw materials. In the area of technology transfer, we are able to take on product implementation ourselves, which is a welcome relief for our customers.

What is being done to combat the innovation slump?

U. Brunk: We have very modern product development expertise and cooperations with different universities involving modern technologies. This leads to the most cost-effective creation of

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Delivering Success

Halocarbon is a leading producer of specialty fluorochemicals, with a portfolio that includes inert lubricants; aliphatic fluorochemical intermediates for pharmaceutical and agricultural chemical manufacturing; inhalation anesthetics; and other specialty fluorochemical products. In April 2005, Peter Murin was named chief executive officer after having been chief operating officer at Halocarbon for 10 years. As CEO, Murin is responsible for overseeing the development and execution of the company's research and development roadmap, as well as the corporate marketing strategies. However, he still takes a hands-on approach in the company's research of new products and applications. Dr. Michael Reubold asked him about Halocarbon's strategic plans as well as the current interest in fluorine-containing building blocks for pharmaceutical ingredients and the overall growth prospects of the fluorochemicals market.

Peter Murin
CEO of Halocarbon

CHEManager Europe: Mr. Murin, could you give our readers a brief overview on Halocarbon's product portfolio and business units, and the customers, markets, and applications you are serving?

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READER SERVICE

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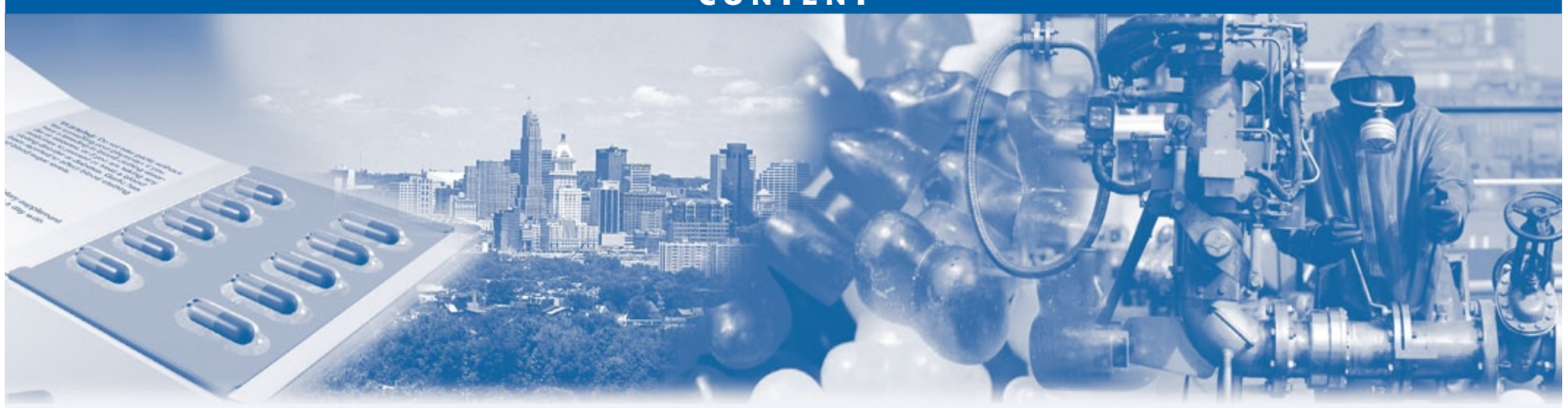

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EU Chemical Industry: 2006 Good Year

The year 2006 was favourable for the European chemical industry. Cefic, the European Chemical Industry Council, expected output in the chemical industry (excluding pharmaceuticals) to grow by 2.5% in 2006, compared to 1.5% in 2005. The growth is clearly above the average growth rate over the last five years. Although the year 2007 may show a modest slowdown, the business of chemistry will remain robust, reaching growth of 2.2%.

According to Cefic, the European chemical industry experienced a positive development during 2006. Chemicals business has improved strongly, mainly driven by the strong domestic demand and the dynamic growth of trade activities with the major EU trade partners. Chemicals sales have improved continuously since the beginning of the year. Domestic sales were expected to grow by 4.6% in 2006. This upswing in domestic sales has been mainly driven by the favourable business climate in most customer industries. This is leading to stronger domestic demand for chemicals in the EU.

The trade development with the major EU trade partners has been a second driver for the growth of the EU chemicals industry. Exports have grown higher than imports, resulting in an encouraging trade surplus. Most chemicals sectors have benefited from the improved business conditions. Basic inorganics, polymers and petrochemicals have continued to grow in 2006. Fine and specialty chemicals are expected to grow by 2.8% in 2006 after a drop of 1.2% last year, eventually taking advantage of a stronger industrial demand – especially from the construction sector. Healthy household confidence has led to higher consumption that is driving up consumer chemicals activity by nearly 4% in 2006.

Against this background, the business climate deteriorated slightly during the last quarter 2006. Current chemicals confidence is still good but optimism is gradually decreasing. Looking ahead, the world economy is expected to experience a slowdown in 2007, essentially in the U.S. Oil price development and the weak U.S. dollar are still a source of uncertainty. Irrespective of these dampening factors, Cefic expects an output growth of 3% in 2007 for the EU chemicals industry as a whole (including pharmaceuticals), moving down from 3.6% in 2006.

▶ www.cefic.org

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A New Amino Emerges

Lutz Thomas
Managing director, Amino

A new Amino has emerged with the completion of a leveraged management buyout of the amino acids business of Amino (Germany). Under the terms of the buyout, the new Amino team, led by managing director Dr. Lutz Thomas and supported by new private investors, acquires the amino acids business together with the main assets of the former Amino. These include its production site in Frellstedt and the jobs at this location, thus making the new Amino one of the few amino acid manufacturers in Europe. In addition, the new company retains the Amino name.

▶ www.aminoactives.com

Dow to Buy Wolff Walsrode from Bayer

The Dow Chemical Company and the Bayer Group have reached agreement for Dow to acquire Bayer's Wolff Walsrode business group, primarily involved in cellulose products. The transaction is expected to close in the first half of 2007, subject to regulatory approval. Financial terms have not been disclosed. Bayer announced in March 2006 that it would divest its subsidiaries H.C. Starck and Wolff Walsrode "As planned, the proceeds will help to finance the acquisition of Schering," Bayer CEO Werner Wenning said. Wolff Walsrode, with 2005 revenues of more than US-$400 million, would become an integral part of Dow's Water Soluble Polymers business.

The new business would combine Wolff's advanced production technology and proficiency in HEMC (Hydroxyethyl Methyl Cellulose) and CMC (Carboxymethyl Cellulose) chemistry with Dow's leading HPMC (Hydroxypropyl Methyl Cellulose) product brands and industry expertise. Cellulose derivatives produced by the combined businesses are used across a broad range of industry sectors, including construction materials, personal care, pharmaceuticals, food and a number of specialty applications.

▶ www.dow.com
▶ www.bayer.com
▶ www.wolff-walsrode.de

Merck KGaA Eyes Divestiture of Its Generics

Merck KGaA is evaluating the divestiture of its generics division (Merck Generics) as one strategic option. The company has reported that it is not engaged in initial discussions with any potential buyers. Irrespective of this strategic evaluation, Merck still plans to make a capital increase of €2 billion to €2.5 billion within the first quarter of 2007. Merck Generics has sales in more than 90 countries and is the number three ranked generics business in the world. In 2005, Merck Generics reported sales of €1.8 billion and an operating result of €238 million. The division employs approximately 5,000 people worldwide. "Merck Generics has a strong business with excellent leadership and good growth prospects for the future. However it will need continued investment to fully realize its potential and strengthen its market presence," said Dr. Michael Roemer, chairman of the executive board of Merck KGaA. "In light of the far-reaching changes occurring in the market we are considering as an option the divestiture of Merck Generics to a qualified buyer."

▶ www.merck.de

Air Products to Acquire Business from Linde

Air Products has reached definitive agreement with the Linde Group to acquire the industrial gas business of BOC Gazy for €370 million. The transaction is subject to regulatory approval and customary closing conditions. For regulatory purposes, BOC Gazy was required to be sold by Linde as a result of its purchase of the BOC Group in September 2006.

The BOC Gazy business had fiscal year 2006 sales of approximately €126 million and earnings before tax, interest, depreciation and amortization (EBITDA) of approximately €38 million. The business has approximately 750 employees, five major industrial gas plants and six cylinder transfills serving customers across a diverse range of industries, including chemicals, steel and base metals, among others.

▶ www.airproducts.com
▶ www.linde.com

MARKET REPORT

Total European Industrial Water Treatment Chemicals Market

Study by Frost & Sullivan

Continued **Page 1**

stern action to ensure compliance to the prescribed standards. Furthermore, with developing economies, the industries, such as pharmaceuticals, food and beverages, dairy industries, are investing in expanding their operations in these regions. Poland, Hungary, Czech Republic and Slovakia are some of the eastern European countries with significant demand for goods. Since industrial processes utilise water as an integral part of operations, these regions are likely to produce more discharge water with increase in industrial activity. These regions have traditionally allowed discharge of waste water into the environment but due to compliance to EU regulations, they are likely to witness market growth around 5-7% per annum for water treatment chemicals for treating these processed waters.

Another major driving factor that is expected to improve the demand for the chemicals is the legislation imposed by the European Commission (EC). The legislation is aimed at safeguarding the environment for future and is one of the key growth-drivers in Europe for the expected demand for the water treatment chemicals. The Urban Waste Water Directive, Water Framework Directive, Discharge of Substances Directives and Biocide Products Directive are some of the key legislative proposals that are expected to have a positive effect on the water treatment chemicals. For example, the Discharge of Substances Directives has proposed the reduction of heavy metals in the discharge water to certain limits. The directive focuses on specific heavy metal pollutants such as cadmium, arsenic, thallium and lead, which are both bio-accumulative and persistent in the environment, and result in harmful effects to humans and aquatic life. Such directives force the industry participants to ensure that their discharged water do not contain such pollutants, otherwise they need to face the penalties.

In addition, there are some important drivers impacting the individual market segments. These are:

- Total water management
- Cost-effectiveness of the chemicals
- Increasing reuse of water
- Flexibility of chemicals
- Applications that require the use of chemicals such as antifoam and odour controlling ones

Market Restraints

The water treatment chemicals market in Europe also faces a few restraining factors. The most significant factor is the slow industrial growth in the European regions. Since the western European regions have almost attained maturity, the outlook for industrial growth is not very positive. The impact of reduced investment leads to minimal innovative products and technology. With the ever-increasing stringent quality standards, the end-users prefer better products and technologies that reduce the amount of contaminants in the discharged water. Lower investment impedes the focus on new products, hence reduces the scope for growth. Another important factor that acts as a restrain for the chemicals is the relocation of manufacturing industry to other regions. For example, the electronic industry has completely shifted to the Asian and south-east regions such as Russia and China to capitalise on the low raw material cost, production and labour costs. This results in the reduction of the major industry and the complimentary industries depending on the value chain. It also results in decreased consumption of chemicals for treating their water in the process systems and discharges.

The specific restraints impacting the individual market segments include:

- Commoditisation of coagulants and flocculants
- Reduction in use of heavy metals in the process
- Decreased use of biocide products
- Alternative technologies such as reverse osmosis, ozonation and ultra filtration

Competitive Analysis

The European industrial market for the water treatment chemicals is competitive. As the chemicals have been used in the industries for decades the chemicals market has almost achieved maturity. The competition exists between major service providing companies and chemicals manufacturers. The chemicals manufacturers are shifting towards enhanced service provision rather than competing on chemicals alone. The major companies include service providing companies such as GE Water and Nalco, and manufacturers such as Kemira, Feralco, Akzo Nobel, Ciba and SNF Floerger. The other major market participants are the distributors such as Univar, Brenntag and Caldic catering to smaller end-users in smaller volumes.

Total Industrial Water Treatment Chemicals Market – Percent of revenues by application type (Europe) 2002 – 2012 **Figure 2**

Year	Industrial Raw Water Segment (%)	Industrial Process Water Segment (%)	Industrial Effluent Segment (%)
2002	18.4	43.8	37.8
2003	18.3	44.1	37.6
2004	18.2	44.4	37.4
2005	18.2	44.7	37.1
2006	18.1	45.1	36.8
2007	18.0	45.2	36.8
2008	18.0	45.5	36.5
2009	18.0	45.8	36.2
2010	17.9	46.4	35.7
2011	17.8	46.8	35.4
2012	17.8	47.3	34.9

Note: All figures are rounded; base year is 2005.
Source: Frost & Sullivan

The main competitive factors determining success or failure in this market include:

- Environmental compliance
- Service provision
- Product and technical expertise
- Innovation
- Distribution
- Price

Compliance to the environmental standards is important for the industrial water treatment chemicals market. With the enforcement of legislation becoming stricter, more end-users are increasingly demanding environment-friendly products. The end-users are voluntarily shifting towards technology and products that produce less contaminant in the discharged water.

Industrial Raw Water Treatment Chemicals Market

The raw water treatment processes use chemical separation as one of the clarification techniques.

This process largely uses chemicals such as coagulants and flocculants, ion exchange resins, antiscalants cleaners and activated carbons. Within the chemicals, the coagulants and flocculants are most widely used for separating the unwanted contaminants from the influent water. They are followed by the antiscalants, cleaners and activated carbons. In 2005, revenues for the industrial raw water treatment chemicals were US-$239.2 million.

The important drivers in this market include:

- Legislation
- New equipment
- Critical industrial application

Major restraints in this market include:

- Shift towards services
- Improving equipment
- Innovation in technology

Kemira, Feralco, Akzo Nobel, Ciba, and SNF Floerger are the leading companies in this market segment.

Process Water Treatment Market

The process water treatment is focused largely on solutions on boiler as well as cooling water, closed circuit systems, heat exchangers and cooling towers. These process systems are very complex, and perform critical operations at varying conditions. Thus the chemicals used widely are the scale and corrosion inhibitors, antifoam and biocides. In 2005, revenues for the industrial process water treatment chemicals were US-$589.3 million.

The important drivers in this market include:

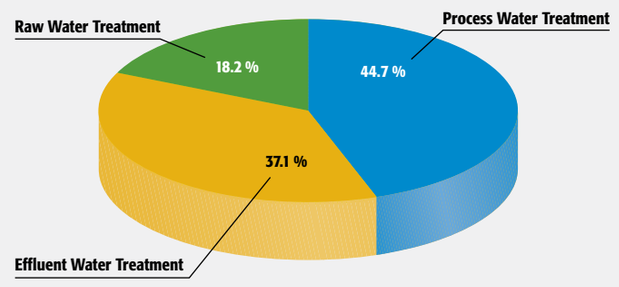
- Characteristics of water to become corrosive
- Equipment safety
- Critical process operations

Major restraints in this market include:

- Advanced equipment
- Alternative technologies

GE Water, Nalco, Drew Industrial, Kemira and Henkel Water are the leading companies in this market segment.

Total Industrial Water Treatment Chemicals Market: Percent of Revenues by Application Type (Europe), 2005 **Figure 3**



Note: All figures are rounded.
Source: Frost & Sullivan
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Effluent Water Treatment Market

The effluent water treatment process is the final treatment before discharging the water into the environment. These process systems treat the water to remove the presence of heavy metals, odour and other visible materials. These treatments use chemicals such as coagulants and flocculants, antifoam, activated carbons, biocides, odour control and heavy metal removal agents.

In 2005, revenues for the industrial effluent water treatment chemicals were US-$488.1 million.

The important drivers in this market include:

- Legislation
- Cost-efficiency of chemicals
- Costly alternative solutions

Major restraints in this market include:

- Reduction in contaminants
- Use of combined solution

Nalco, GE Water, Yara, Kemira, Rhodia, Norit and Calgon Carbon are some of the leading companies in this market segment.

Conclusion

The European market for industrial water treatment chemicals is highly competitive and has attained near maturity levels. The opportunity for growth exists for water treatment chemicals through the inclusion of the Eastern Europe. These regions are attracting investment from global companies in building and expanding their production plants over a broad range of industries such as paper and pulp, refineries, pharmaceutical, mining and automotive. In addition, the compliance to environmental standards will be forcing these market participants to invest in facilities to ensure health, safety and also environmental safety. These factors result in improved technologies that reduce the consumption of chemicals and energy, and improve productivity. Furthermore, the slow industrial health is forcing the market participants to focus more on the providing tailor made services for the customers to ensure continuous business relationship.

www.frost.com

See also interview page 4

Linde Group Acquires Russian Technical Gases Supplier The Linde Group has acquired the Russian company SaKiZ (ZAO Samarsky Oxygen Plant), a regional supplier of technical gases, located in the south Russian city of Samara. Terms of the transaction were not disclosed. The company employs more than 200 people and produces and sells air gases (nitrogen, oxygen, carbon dioxide, helium and argon), both in liquefied and gaseous form.

▶ www.linde.com

Celanese to Acquire Celanese AG Minority Shares Celanese (USA), a global hybrid chemical company, has reached an agreement with the minority shareholders of Celanese AG, its German subsidiary, to acquire their shares for €66.99 per share, the same price offered by Celanese in May 2006. The total purchase price for the minority shares, representing 2% of the outstanding shares, is approximately US-$80 million. The minority shareholders have dismissed their legal actions challenging the completion of the acquisition of Celanese, which began in 2004.

▶ www.celanese.com

RAG's Subsidiary Degussa Sells Industrial Chemicals Business Degussa is parting from its industrial chemicals business via a management buyout. Through the buyout the managing director of Mannheim-based Goldschmidt TIB, Dr. Karsten Tiemann, takes over the activities in Germany and Mexico. The U.S. business is to be sold separately. Silence has been agreed on details of the management buyout.

▶ www.degussa.com

Orica Sells Adhesives and Resins Businesses Orica announced that the Australian Competition and Consumer Commission (ACCC) has advised that it does not propose to intervene in the sale of Orica's Adhesives and Resins businesses to Hexion Specialty Chemicals, which was first announced on 25 August 2006. The sale includes Orica's Adhesives & Resins businesses in Australia and New Zealand. Under the agreed terms and conditions of the transaction, the consideration for these businesses remains confidential. The divestment shall generate a book profit on sale, which will be disclosed as an individually significant item in Orica's financial results for the first half of fiscal year ending 30 September.

▶ www.orica.com

Akzo Nobel Agrees to Sell Flexsys Stake Akzo Nobel has reached an agreement in principle to sell its 50% stake in rubber chemicals business Flexsys to joint venture partner Solutia. Financial details were not disclosed. The proposed deal also includes the sale of Akzo Nobel's toll manufacturing operation for Flexsys at the company's Kashima site in Japan.

"The recent realignment of our Chemicals portfolio concentrated our focus on core business," explained Leif Darner, Akzo Nobel's board member responsible for chemicals. "Our stake in Flexsys no longer fits in with our future growth plans." Formed in 1995, Flexsys is a global supplier of chemicals to the rubber industry, employing around 1,000 people worldwide. Sales in 2005 totaled approximately US-$600 million.

▶ www.akzonobel.com
▶ www.flexsys.com

The Linde Group and Sinopec Qilu to Form Joint Venture The Linde Group and refining and chemical company Sinopec Qilu Company have signed an agreement to form a 50/50 joint venture as well as a long term industrial gases supply contract. The joint venture, named Zibo BOC Qilu Gases, has a total investment of approximately US-$64 million. Additionally to Sinopec Qilu's two existing air separation units, which will become property of the new joint venture, a new air separator with a capacity of 1,500 t of oxygen per day will be erected at Zibo, Shandong Province (PRC), until March 2008. Ultimately, the joint venture with a staff off around 180 will supply Sinopec Qilu, other companies in the Zibo area, and third party markets with a total of more than 4,000 t of oxygen, nitrogen and argon per day.

▶ www.linde.com
▶ http://english.sinopec.com

Celanese to Sell Oxo Products and Derivatives Businesses Celanese has entered into an agreement to sell its oxo products and derivatives businesses, including European Oxo (Germany), a joint venture between Celanese (Germany) and Degussa (Germany), to Advent International, a global private equity firm, for the purchase price of €480 million, which is approximately US-$630 million at current exchange rates. This sale is consistent with Celanese's strategy to optimize its portfolio and divest non-core businesses.

▶ www.celanese.com
▶ www.adventinternational.com

Heerema Fabrication Group Acquires AGA Engineering Heerema Fabrication Group (HFG) located at Zwijndrecht in the Netherlands, a company providing engineering and construction solutions for clients in the oil and gas industry, has reached agreement on the acquisition of the entire share capital of Albert-Garaudy Consulting Engineers with offices in Metairie, Louisiana and Houston, Texas, U.S. Albert-Garaudy Consulting Engineers (AGA) is a multi-disciplined consulting engineering company serving the international oil und gas, refining and chemical industries and employs 300 people.

▶ www.heerema.com
▶ www.aga-engineers.com

Rhodia to Sell its European Industrial Fibers Business Rhodia announced the signing of an agreement for the sale of its European industrial fibers business to Butler Capital Partners. This business employs 1,200 people, based in Germany, Latvia, Poland, Slovakia and Switzerland. The divestiture of this business, classified in "Discontinued Operation" in the second quarter 2006, reduces the group's consolidated net sales 2005 by €163 million.

The transaction is expected to be finalised in the coming weeks, once all necessary legal authorisations have been obtained.

▶ www.rhodia.com

Sika Acquires Proxan Dichtstoffe Proxan Dichtstoffe, a German company located in Greiz, Thuringia, is a manufacturer of sealants for the production of insulated glass and for construction joints. The parties agreed not to disclose the purchase price. Proxan develops, produces and sells sealants made from polysulfide and twocomponent-polyurethane. The company is staffed by 13 employees. With the acquisition of Proxan Sika augments its technologies, particularly in sealants for the production of insulated glass. Sika, located in Baar, Switzerland, is a globally active company supplying the specialty chemicals markets.

▶ www.sika.com

Water Treatment Chemicals Market

Understanding Customer Requirements, Strong Relations Key

The European industrial water treatment chemicals market landscape is changing. Due to the increased demand of environmentally friendly products, chemical manufacturers have an increased responsibility to supply such products to their end-users. In order to stay competitive, companies are shifting toward providing more customer service, which also includes total-service solutions. Also, thanks to their lower production and labour costs, Eastern European countries have become popular amongst global companies. Brandi Hertig spoke with Mahesh Kumar S, Frost and Sullivan analyst, on the trends in this market.

CHEManager Europe: Would you go into detail as to what challenges the market is facing? Where is the market heading?

M. Kumar S: The major market challenge is to provide cost-effective solutions to end-users while complying with legislation. Industry wide, end-users are demanding and even forcing price reductions from chemical manufacturers.

The market is heading towards increased responsibility of chemical manufacturers to supply eco-friendly products to various end-users. In addition, due to the bulk volume usage, there is increased competition to profitably sustain business transactions. This competition is shifting towards providing better services to customers meaning total-solutions are being preferred to just chemical products alone by end-users. This requires providing a host of services around chemicals for instance, dosage equipments, customised products, automated equipments, legislative knowledge and expert service.

How can companies better manage restraints on the individual market segments?

M. Kumar S: Interestingly, most of the chemicals within each segment are unique due to product and technology expertise, thus the presence of a broad range of participants. Few participants have expertise and focus on multiple segments. Activated carbon manufacturers are a separate market segment, while resin manufacturers also have their own unique capabilities.

Understanding customer requirements and developing strong relations is the key to sustaining business. Furthermore, participants need to focus on continuous innovation of products and technology to provide solutions to customers on a long term effect.

Would you elaborate on the impact Eastern European countries have or will have on the European industrial water treatment chemicals market?

M. Kumar S: Eastern European regions present a significant business potential for most chemical manufacturers. This region has traditionally allowed discharge of effluents into water systems and accession into EU has mandated compliance to its Water Framework Directive, requiring massive clean-up. The number of industries in these regions is considerably less to those in Western countries; however their use of water is immense such as paper and pulp; textiles; food and beverages; and mining industries.

At present, a major focus in this region is towards construction of municipal water treatment plants. The industries are now encouraged to be more responsible and take corrective actions for their discharge. Regional governments are also likely to penalise the polluter.

How much of a threat do low-cost producers pose?

M. Kumar S: Low-cost producers, or LCPs, are a prime threat for commodity products market participants. The advantage for these participants arises due to subsidies from their governments and the foreign exchange which encourages for exports into Europe. These LCPs suffer from brand recognition; product quality issues; inadequate service quality; high investment costs for plants, labour, approval, etc.; logistical issues; outdated technology; and legislative knowledge.

With the adoption of the EUs chemical legislation Reach, most LCPs are likely to find European markets difficult to penetrate due to the costs involved in their approval. Overall, threat from LCPs can be termed medium in the current competitive climate.

How can Western manufacturers, service providers and distributors of industrial water treatment chemicals capitalise on the Eastern European market?

M. Kumar S: The Eastern European markets have already well established water treatment companies however the enormity of treatment requirement provides significant potential for new entrants also. Municipal water treatment market exhibits immense potential, followed by industrial treatment market. Although they are interlinked to a certain extent, the volume of water to be treated for public far outweighs industries. For manufacturers, municipal sector is more suitable since business mostly happens through tenders or contracts and volume requirement is high, whereas service providers have ample opportunities within Industrial set-up. Certain industries, such as paper and pulp, textiles, water treatment plants and power plants may require bulk quantities of water treatment chemicals, thus manufacturers can compete in this market too, while service providers focus more on technology and automation. Distributors play an important role for manufacturers in addressing smaller and distant markets in these regions.

How does the European industrial water treatment chemicals market compare to those in the U.S. and Asia?

M. Kumar S: Industrial water treatment chemicals markets has attained maturity phase both in U.S. and Europe, while Asia is still considered a nascent market. Significant industrial growth being witnessed in Asian regions is raising awareness on environment well-being. However, no specific studies have been made on the industrial market sector for water treatment chemicals in U.S. and Asian regions. Hence, cannot speculate on those markets.

In 2002 Peter W. Nichols, president of SNF Holding Co., said, "We envisage that the majority of our business in 10 years will be in the Far East relative to today, where it is a minority." Now nearly five years on, how true is this statement?

M. Kumar S: The Eastern hemisphere is experiencing high growth prospects in almost all industries. This is exhibited by the increase in manufacturing plants in these regions. Growth in industrial plants directly lead to increased use of water and a corresponding need to treat water being discharged.

Entry of renowned, world-class companies into these regions with good manufacturing practices and advanced technologies force regional companies to follow suit. In addition, as these regions are improving in terms of living standards, consumers are increasingly aware and demands environment safety, indicating increased water treatment requirement.

What kind of impact can be expected on the market from the various EU-imposed directives on water treatment and the discharge of dangerous chemicals?

M. Kumar S: The most commonly expected outcome or strategies to be followed by end-users are: decreased use of chemicals; miniaturisation of products; environmentally friendly products; and advanced automated systems.

Industries in Western European countries have well-established water treatment facilities and exploring new methods to decrease their dependence on chemical treatment. However, The EU-imposed sanctions also have a bearing on the municipal front, thus forcing regional governments to install common water treatment plants in regions having a specified population.

What impact would government privatisation of water infrastructure have on the industry?

M. Kumar S: The issue of privatisation of water infrastructure is being viewed with caution, although it would be most welcome from industry participants for the size of business. However, it's considered a corporations and also on possible increase in tariffs. Industry participants also need to be concerned over possibilities of dispute and litigation that might ensue and impacting business.

▶ www.frost.com

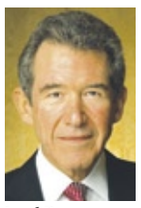
See also pages 1, 3

Lanxess Acquires Dow Activities

Lanxess will purchase the chrome chemicals activities of the Dow Chemical Company in South Africa. Lanxess is to acquire the 50% interest in Chrome International South Africa (CISA), Newcastle, South Africa, which Dow currently owns through its subsidiary Sentrachem. The remaining 50% of CISA is already owned by Lanxess. It has been agreed not to disclose the purchase price. Closing of the transaction, which is subject to the approval of the antitrust authorities and the board of Dow, is expected for the first quarter of 2007.

▶ www.lanxess.com
▶ www.dow.com

BP Announces Lord Browne's Retirement


Lord Browne


Tony Hayward

After more than a decade in the CEO role, BP's Lord Browne has decided to retire as chief executive at the end of July. The board announced that Tony Hayward, currently BP's head of exploration and production, will succeed Lord Browne following his retirement as group chief executive. During Lord Browne's tenure as the chief executive of BP he has presided over a fivefold increase in the company's market capitalisation to £104.6 billion and profits to US-$22.3 billion; while the share price has gone up around 250% to 532 pence and earnings per share have gone up over 600%.

▶ www.bp.com

Bayer Schering Pharma Appointments


Andreas Busch


Kemal Malik

The supervisory board of Bayer Schering Pharma has appointed Prof. Dr. Andreas Busch and Dr. Kemal Malik to the company's board of management effective 1 February. Busch and Malik will also become members of the Bayer HealthCare Executive Committee.

Prof. Dr. Marc Rubin, currently member of the Bayer Schering Pharma Board of Management responsible for research and development and member of the Bayer HealthCare Executive Committee left the company by mutual consent at the end of January. Rubin's present duties are to be split between the two new board members. Busch will head up research, while Malik will assume responsibility for development. Busch is currently head of global drug discovery at Bayer Schering Pharma. Malik is currently head of global development and chief medical officer at Bayer Schering Pharma.

▶ www.bayer-ag.de
▶ www.schering.de

NNE Acquires Pharmaplan

The international life science engineering and consultancy company, NNE, has reached an agreement with the health care group Fresenius ProServe to acquire its subsidiary, the Germany-based engineering company Pharmaplan. The two companies will unite under the name of NNE Pharmaplan. Both NNE and Pharmaplan operate in the biotechnological and pharmaceutical industries, and by joining forces they will become one of the world's leading companies in that particular field of engineering. The acquisition was effective as of 1 January, but will have to await the final anti-trust approval before it can be finally implemented. This is anticipated to happen in the first quarter of 2007. Until then the two companies will continue to operate separately. NNE and Fresenius ProServe have agreed not to disclose the financial terms of the acquisition.

▶ www.nne.biz
▶ www.pharmaplan.com

Lanxess To Divest Business

Lanxess announced a divestment of its North American Textile Processing Chemicals (TPC) business unit. StarChem, a specialist in textile and speciality chemicals, will acquire the operations based in Wellford, South Carolina, U.S., and Montreal, Canada and will employ major part of the workforces. StarChem is a subsidiary of Star Holdings, Dalton, Georgia, U.S. and will be headquartered in Wellford. The purchase price for the activities of TPC in North America was not announced. The TPC business unit has around 380 employees worldwide and reports sales of €150 million.

▶ www.lanxess.com

Eastman Completes Polyethylene Sale

Eastman Chemical Company has completed the sale of its polyethylene business to Westlake Chemical Corporation. The sale includes Eastman's polyethylene and Epolene polymer businesses, related assets and the company's ethylene pipeline. The sale is for a purchase price of US-$255 million, subject to working capital adjustments. Included in the sale are three polyethylene manufacturing units, an Epolene facility, all of which are located at Eastman's Texas Operations in Longview, and an ethylene pipeline between Mont Belvieu, Texas, U.S., and the Longview plant site.

▶ www.eastman.com
▶ www.westlakechemical.com

chemanager@gitverlag.com

Surrounding The Customer

Effective M&A in the Chemical Industry

The most discussed topic related to chemicals mergers and acquisitions (M&A) is the prospect for more mergers in the next few years, with an eye toward industry consolidation needs. The second most-discussed area in M&A is the availability of "deals," meaing companies that can be bought for a low price. Accenture's point of view is that neither of these should be a guiding criteria for chemical companies, rather chemical executives should be focusing on what it takes to fulfill a customer-focused growth strategy. A review of major chemical industry mergers since 2000 has revealed that the most successful mergers are part of a broader customer-focused growth strategy and that to execute successfully, merger planning and experience counts. Companies planning to use M&A should beware of the potential pitfalls.

Accenture Research analysed, from public data sources, 13 companies that have been involved in significant mergers (with deals averaging, in aggregate, about 34% of their market capitalisation) that have occurred in the 2000 and 2001 period, based on simple measures such as operating margin; cost of goods sold (as a percent of sales); selling, general and administrative expenses (as a percent of sales); and return on assets. The data were normalised against the average performance of 20 leading chemical companies, so that the impacts of the industry cycle were mostly removed from the data. The data was measured over a four-year period following the merger year. The companies were then split into performance groupings, "tier 1" being the best performing and "tier 3" the worst performing of the companies studied. Tier 1 companies were able to grow operating margin and return on assets while decreasing costs (as a percent of sales), on a cumulative basis, four years after merger relative to peer chemical industry producers.

Merger Execution Needs Speed

Accenture Research found that tier 1 companies included a mix of mergers for market share/consolidation value and/or for serving customer needs better. The idea of merging for market share is typically linked to an industry capacity consolidation need and mergers tend to look for immediate benefits in cost reduction through site (plants, offices, employees, etc) rationalisation and overhead expense reductions. For this type of merger, speed is critical, as well as managing expectations from shareholders. It was found that the companies that were proficient in mergers typically set shareholder expectations low and then went on to achieve better-than-planned cost reductions. They also had integration plans developed and communicated to employees and customers early in the process. Realisations of merger synergies were mostly accomplished within a two-year period by the leaders. Companies without merger experience made several mistakes, including late/absent plans for integration; high shareholder expectations setting; acquisition of too large a portfolio of non-strategic assets; restructuring parent companies to meet the acquisition target processes (or "tail wagging the dog"); and poor communication to shareholders, personnel and customers during the merger process. Some of the poor performers acquired assets that were considered non-strategic at merger, as part of the portfolio acquired, and held on to them for up to three years. Leaders typically had disposal plans ready before merger.

Added Service Brings Added Value

The most successful mergers were accomplished as a single component of a broader strategy to "surround" the customer, that is, serve more customer needs. Sometimes these customer needs are not obvious and must be uncovered or developed. An everyday example of this is the addition of a convenience store to a gas station or of a coffee shop to a book store. In both examples, more revenue is generated from the same customers, but from products other than the original products being sold, in this example, gasoline or books.

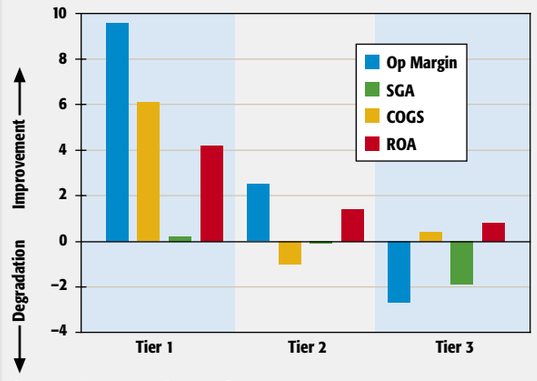
In the chemical industry, this means that the most successful acquisitions expand product coverage per market/business line, emphasise a new/enhanced product technology and/or add a service. Merger leaders did not ordinarily acquire volume for the sake of growing volume; their focus was growing customer accounts. Leaders also characteristically have an active research and development (R&D) program geared toward the same ends, with the merger adding the incremental breadth needed to make serving the customer more complete (by bringing needed technology or products). Customer-focused acquisitions improve shareholder value not by cost reduction in itself, but rather the associated revenue growth from new "value-added" activity. The revenue growth achieved outruns the typical cost increases.

Other characteristics of successful mergers include standardising leading practices and technologies across new businesses; strong communication with customers, employees and shareholders; rapid process integration (including information technology systems, and other back office activities); employee acculturation programs (including training); and picking effective leaders of integration processes and projects.

One example of a tier 1 company is the Dow Chemical Company. They were successful, for instance, in the integration of Ascot into their custom and fine chemicals business. The acquisition, valued at US-$718 million, occurred in 2001. Dow had already had clearly established an integration engine where they were able to quickly make decisions and integrate operations. As a corporation, Dow has decreased its costs (as a percent of sales) and increased operating margins relative to its peers after mergers during the study timeframe.

Chemical executives should be focusing on what it takes to fulfill a customer-focused growth strategy

Net improvement in financial metrics after merger (four year change), normalized against industry average.



Source: Accenture Research © GIT VERLAG

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Chemtura Petroleum Additives Forms Mid-East Distributorship Chemtura's Petroleum Additives business group has named Aviation Technology and Turbine Services (ATTS) of Marlton, NJ, as exclusive distributor of its Hybase line of magnesium sulfonate fuel additives (M-14D and derivatives) in Saudi Arabia, United Arab Emirates, Bahrain, Qatar, Yemen, and Oman. Hybase magnesium sulfonate fuel additives are highly effective at reducing SO_3 emissions and controlling corrosion in gas turbines and other power generation units burning heavy fuels.

▶ www.chemtura.com.

FMC and BASF to Exchange Access to Key Active Ingredients FMC and BASF announce several new multi-year supply agreements that will allow both companies to expand their crop protection portfolios in several key crop segments. The agreements will grant BASF access within the U.S. to a proprietary insecticidal chemistry owned by FMC – zeta-cypermethrin. FMC will gain access within the U.S. to two active ingredients owned by BASF, pendimethalin and imazethapyr. BASF will begin marketing new Respect insecticide in 2007 – based on zeta-cypermethrin – for control of several economically significant insect pests in a range of crops, including vegetables, corn, soybeans, cotton, wheat, and alfalfa. FMC will be developing premix products with pendimethalin and imazethapyr with its own proprietary herbicide portfolio over the next two years for use in soybeans, sunflowers and tobacco.

▶ www.fmc.com
▶ www.basf.com

BASF and TOYO Cooperate Toyo Engineering (TOYO), Chiba/Japan, and BASF have entered into a cooperation to market and sell a gas purification technology specifically designed to purify synthesis gas streams for Integrated Gasification Combined Cycle (IGCC) power plants and chemical products such as Methanol. The technology, which will be marketed under the brand name PuraTreat A, has excellent properties to selectively remove sulphur compounds such as hydrogen sulfide or carbonyl sulfide from synthesis gas streams based on coal.

▶ www.toyo-eng.co.jp
▶ www.basf.com/intermediates

Degussa Strengthens PEEK Marketing with Sales Partnerships Degussa has further strengthened its marketing activities for polyetheretherketone (PEEK). Three partnerships were formed in Europe to distribute and sell small quantities of the whole range of PEEK products traded under the name Vestakeep. Grässlin KBS Kunststofftechnologie, Germany, will take charge of retail sales in Germany while Austria and Switzerland will be served by Dolder, Switzerland.

LATI, Italy, was enlisted as the marketing partner for Italy, France, Spain and Portugal. As does Degussa for its direct customers, all three companies also offer their customers technical support. Larger quantities of Vestakeep are marketed directly by Degussa.

▶ www.degussa.com

Süd-Chemie and Inco Establish Joint Venture Süd-Chemie (Germany), a supplier of catalysts for the chemicals and refining industry and for environmental applications, and Inco (Canada), a nickel and nickel specialties producer, have agreed to establish a joint venture company for the production and marketing of catalyzed diesel emission control materials for the automotive industry. Equity interests in the new company named Alantum will be divided equally between Süd-Chemie and Inco ECM (Germany), a wholly-owned indirect subsidiary of Inco. Alantum will concentrate initially on diesel oxidation catalyst (DOC) and diesel particulate filter applications (DPF) for European passenger car and light truck markets. Production will take place in a new facility at Süd Chemie's Heufeld site in Germany. Commercial scale production is expected to begin in 2008.

▶ www.sud-chemie.com
▶ www.inco.com

BASF and Helm to Start Collaboration Helm and BASF have agreed on a long term collaboration in the field of animal nutrition products. BASF supplies Helm with high quality feed additives. Helm will market them to a variety of customers in the different market segments of the feed industry by using their marketing and sales expertise as an established marketing channel.

▶ www.basf.de
▶ www.helmag.com

EC Hands Down €519 Million in Fines

The European Commission has fined five groups of companies a total of €519 million for participating in a cartel to fix prices and share customers for certain types of synthetic rubber (Butadiene Rubber, known as BR;and Emulsion Styrene Butadiene Rubber, or ESBR), in violation of the EC Treaty's ban on restrictive business practices as stated in article 81.

"Companies belonging to the groups Eni, Bayer, Shell, Dow, Unipetrol and Trade-Stomil operated the cartel from at least 1996 to 2002," the commission said in a statement announcing the fine. The fines on ENI, Shell and Bayer were increased by 50% because these companies had already been found guilty of taking part in cartels. However, as Bayer tipped off the EU about the cartel, the company has been declared immune from fines.

Synthetic rubbers BR and ESBR are extensively used for the production of tyres as well as for the production of other consumer goods. The overall fine is the second highest imposed by the Commission in a cartel case, and brings the total amount of cartel fines imposed this year to €1.843 billion – a new annual record for the commission.

EU competition commissioner Neelie Kroes said, "The commission has imposed high fines in this case, but if companies continue to indulge in cartel activities, then they can expect their fines to be even higher in the future."

The investigation was prompted by applications for leniency lodged by Bayer in December 2002 and January 2003, under the 2002 Leniency Notice. In March 2003, the Commission carried out an unannounced inspection at Dow, which subsequently applied for leniency. Bayer received full immunity from fines under the Commission's leniency programme, as it was the first company to come forward with information about the cartel.

The largest fine imposed by the commission on a cartel came in 2001, after it ordered eight pharmaceutical firms to pay €790 million euros for fixing the price of vitamins.

▶ www.europa.eu

Company name and location	Reduction of fine %	Reduction of fine* (euros)	Fine* (euros)
Bayer, Germany	100	204,187,500	0
Dow, U.S.	40	43,050,000	64,575,000
ENI, Italy	0	0	272,250,000
Shell, Netherlands	0	0	160,875,000
Unipetrol, Czech Republic	0	0	17,550,000
Trade-Stomil, Poland	0	0	3,800,000
TOTAL		247,237,500	519,050,000

*the corresponding legal entities may be held jointly and severally responsible for the whole or a part of the fine imposed
Source: European Commission

Developing What the Customer Wants

Halocarbon Delivers Quick Responses

Continued Page 1

P. Murin: Our fluorochemicals business contributes more than half of Halocarbon's revenues. Most of the fluorochemicals are sold to the major pharmaceutical and agricultural chemical companies, but there are also a number of other interesting and proprietary uses for them. The rest of the business is roughly split between the inhalation anaesthetics and inert lubricants. Right now, isoflurane is the only inhalation anaesthetic we sell, but we hope to introduce sevoflurane shortly. The anaesthetics are sold to distributors around the world. The major application for the inert lubricants is in strong oxidizer service – oxygen and chlorine, for example. They too have a number of interesting uses – our customers can be quite imaginative! Halocarbon is a privately held company, and we do not release financial information. Also, we do not release information about our customers or their applications.

What are the core competences and key technologies of Halocarbon, what is its unique selling proposition?

P. Murin: For over 50 years, Halocarbon has been about fluorochemicals and the fluorinations to make them. In particular, our niche has been aliphatic fluorochemicals – essentially all of our current products fall into this category. We are doing some work on compounds with an aromatic component. We were the first to commercialise the major trifluoromethyl containing compounds trifluoroacetic acid and trifluoroethanol. We've been looking at difluoro compounds since there is some interest in them from customers.

Which brings up an important point: The common thread in our business is getting fluorine into a molecule for our customers' benefit. We have a number of techniques we've developed and refined over the years. We've also always been customer driven. Halocarbon's true "R&D Director" is our customers – we develop what our customers want. Usually, within days of an inquiry we get back to our customers with a price idea if it's a compound we think we can help them with. And there are cases where we've scaled up to large volumes in a relatively short period of time to meet a need. Most of our customers aren't accustomed to such responsive service.

What are the fastest growing areas of your portfolio?

P. Murin: Generally, growth is driven by pharmaceutical and ag chemical applications.

With over 50 years experience in fluorine chemistry, did it catch you by surprise that fluorine has become such an important element in pharmaceutical ingredients in recent years?

P. Murin: No; there's been a slow and steady effort to get information and compounds out to researchers so they can experience the benefits that fluorine can bring to their application.

On which topics are you focusing your R&D efforts at the time being?

P. Murin: We're always receiving inquiries about interesting compounds. As I said earlier, our customers are Halocarbon's R&D director. There are a number of things we're working on but unfortunately I can't talk about them because of confidentiality issues, which can be frustrating because we have a lot of good stuff going on!

Aside from organic growth, does your growth strategy to further develop Halocarbon's business include alliances or acquisitions?

P. Murin: Halocarbon's growth has always been organic, and there are no immediate plans to change that. At this point, we wouldn't want to do something that would lessen our focus on fluorine.

Your fluorochemicals brochure is available in Chinese to provide information for prospective Chinese customers. What role does Asia, or China in particular, play in your growth strategy compared to North America or Europe?

P. Murin: China is obviously a growing market, including for fluorochemicals, so we are interested. We have a dedicated Chinese distributor to service our customers there. We've also created tools, including a language specific web site and brochure, for the benefit of our customers there. But it's important to note that we are also seeing growth in North America and Europe. Our strategy: We're global, and are happy to sell anywhere in the world.

On the other hand, new competition for Western chemicals makers is arising from Asian companies who quickly adopt technological skills. How far are those competitors away from entering the more sophisticated fluorochemicals market?

P. Murin: Our planning anticipates relatively quick entry. We are selling into China, so we are organised to compete. Given that and our history of responsiveness, customer focus, responsible manufacturing, consistency and quality, we are the fluorochemical supplier of choice.

Two years ago, in a time when the specialty chemicals industry was concerned about over-capacities, Halocarbon expanded its manufacturing facility in North Augusta, South Carolina, to accommodate additional custom manufacturing capabilities. How is the plant utilisation today? What are your next investment plans?

P. Murin: The plant utilisation is high. That expansion was unusual in that it was a discrete project and was announced. We are continually making investments in our capacities and capabilities to meet our customers' needs.

▶ www.halocarbon.com

Merck KGaA: 2006 Sales Up 8.5%

According to preliminary figures, Merck Group sales for 2006 rose 8.5% to €6,259 million, with all five divisions – most significantly the Ethicals and Liquid Crystals divisions – contributing to the sales growth. Fourth-quarter sales were up 9% to €1,625 million despite negative currency effects. Organically, group sales rose 9.4% for the year and 12% in the fourth quarter. Merck's full-year operating result rose a 25% to €1,105 million, surpassing the previous record high set in 2005 of €883 million – which included two up-front payments totalling €70 million. The company said the numbers are preliminary figures and it is too early to release information on a dividend for 2006 or an outlook for 2007.

▶ www.merck.de

Lonza Reports Net Income Increase

Switzerland-based Lonza has announced an 18.1% increase in net income – CHF 222 million – for 2006. EBIT in 2006 increased to CHF 344 million (+15.8%), compared with CHF297 million the previous year. The company contributed the results to positive performance in its biopharmaceuticals activities. Sales reached CHF2,914 million, up 15.6% from the 2005 figure. Approximately half of this increase resulted from higher raw material prices. The company's board of directors is proposing a dividend of CHF1.50 per share. The company said its 2006 business year was characterised by the successful transformation of its portfolio to the life sciences, which it predicts will make up 90% of 2007 sales.

▶ www.lonza.com

Albemarle Announces Double Profit

Specialty chemicals producer Albemarle said its fourth-quarter profit nearly doubled, aided by changes in foreign tax rates. The company reported a record fourth-quarter 2006 net income of US-$63 million, up from US-$32.2 million, for fourth-quarter 2005. Fourth-quarter 2006 earnings include US-$5.4 million, or 11 cents per-share, of non-recurring tax benefit due principally to changes in foreign tax rates and the resulting reduction of deferred tax balances. Fourth-quarter 2005 net income, excluding special items, was $34 million. Fourth quarter 2006 net sales totalled The US-$585 million, compared to fourth-quarter 2005 net sales of US-$588 million.

▶ www.albemarle.com

DuPont Reports Strong Earnings

DuPont reported strong quarterly earnings, driven by strong profits at its coating division and onetime gains. The company's net income in the three months rose to US-$871 million from US-$154 million, in the fourth quarter of 2005. The latest quarter figures include US-$449 million, from tax settlements and insurance recoveries. Profits at the company's coatings unit jumped 84% to US-$282 million.

DuPont's total sales rose 8% to US-$6.28 billion in the latest quarter, from US-$5.83 billion in the same period a year earlier, due in part to higher local selling prices and a 2% currency benefit. The company reported a 4% rise in its worldwide sales volumes due to rising demand in markets and increased sales of engineering and packaging polymers, elastomers, and crop protection and seed products. The company's sales in the U.S. declined by 3% during the fourth quarter of 2006.

▶ www.dupont.com

BASF Future Business to Buy Pemeas

BASF Future Business has agreed to acquire Frankfurt-based Pemeas, a supplier of fuel cell components, from a group made up of seven investors. No financial details were disclosed. The acquisition was to be completed by the end of January. Through this move BASF is strengthening its activities in the field of energy management – one of five growth clusters, in which BASF is developing new technologies and materials for energy storage and energy conversion, as well as for alternative energy capture. Pemeas was founded in April 2004 as a spin-off of the former Hoechst Group's fuel cell activities. The company has approximately 50 employees and operates manufacturing and R&D facilities in Germany and the United States. According to industry expectations, the global fuel cell market will grow from €1 billion in 2010 to €21.5 billion in 2020.

▶ www.basf.com
▶ www.pemeas.com

chemanager@gitverlag.com

Production
FACILITIES · PROCESSES · TECHNOLOGIES

Logistics

The three golden rules of waste disposal logistics

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Industrial Locations

Land of opportunities: America's Midwest

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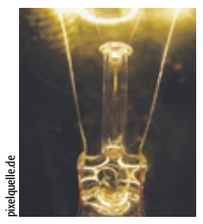

pixelquelle.de

Energy

The European Commission proposes energy and climate package

Page 10

Degussa to Construct Methacrylate Verbund Production

Degussa plans to construct a major Verbund production (integrated production network) in Shanghai to manufacture methyl methacrylate (MMA) and methacrylate specialties. The investment volume for the entire plant including all intermediates is around €250 million, making it Degussa's second-largest single investment. The world-scale facility is scheduled to come on stream in 2009 on completion of the construction phase, which should last approximately two years.

Once all the approvals have been obtained from the Chinese authorities, Degussa will construct an MMA facility with an annual capacity of 100,000 t, which will practically all be processed into highly-refined methacrylate specialties and polymers.

▶ www.degussa.com

Veolia Water to Build Reverse Osmosis Plant in Oman

Veolia Water, with the support of its Omani partner Suhail Bahwan Group, has won a BOO (Build, Own, Operate) contract for a major reverse osmosis desalination plant near Sur. The new contract strengthens Veolia Water's presence in Oman. The 22-year operating contract, awarded by the Sultanate of Oman's Ministry of National Economy, should represent an estimated global consolidated revenue of €434 million for Veolia Water, including the construction of the new plant. The plant will have a capacity of 80,200 m³/d and will supply drinking water to the 350,000 people resident in the Sharqiyah region. It will be built by Veolia Water Solutions & Technologies (VWS), in a consortium with Bahwan Engineering Company, for a total of €111 million, of which 52% for VWS. VWS is in charge of process design and equipment purchasing, with Bahwan Engineering Company responsible for construction and equipment installation.

▶ www.veoliawater.com
▶ www.suhailbahwangroup.com

Borealis Invests €90 million in Polypropylene Business

Borealis will invest €25 million to expand the capacity of its PP plant in Porvoo, Finland, by 65,000 t/y to 220,000 t/y by the end of 2008. Borealis will also invest €35 million to create a four-reactor configuration at its Borstar PP plant in Schwechat, Austria to meet the needs of the automotive, pipe and advanced packaging industries. The additional gas phase reactor is planned to be operational during 2009. In addition, Borealis will invest €30 million in a four-reactor BorstarPP pilot plant at Schwechat that shall strengthen the company's ability to readily develop innovative, advanced multimodal PP solutions. The pilot plant will be completed in 2009.

▶ www.borealisgroup.com

Uhde to Build Turnkey Complex in Egypt

Egyptian Propylene & Polypropylene Company (EPPC), under the lead of Oriental Weavers Group, has commissioned Uhde to build a turnkey petrochemical complex in Port Said, 170 km north-east of Cairo. The complex will consist of a propylene plant and a polypropylene plant with respective annual production capacities of 350,000 t as well as all appurtenant utilities and offsites, including an air fractionation and refrigerating unit, and the required storage tanks. EPPC is investing US-$680 million in this new petrochemical complex. Completion is scheduled for late 2009. Propane from Egyptian natural gas deposits will be used as the feedstock.

▶ www.uhde.biz

ABB Wins Refinery Order in Poland

ABB has won a contract from Grupa Lotos S.A. to provide engineering, procurement and construction for a diesel desulphurization (HDS) project in Gdansk, Poland. The US-$130 million investment is part of the US-$1.3 billion Residue Upgrade Project that Grupa Lotos has begun in a complex of Gdansk refineries to help them operate more efficiently and satisfy growing regulatory demands for environmentally friendly refinery products. The desulphurization unit will enable Grupa Lotos to comply with EU requirements that diesel oil contain less than 10 ppm of sulphur, which will come into force in 2009.

ABB Lummus Global's business in Wiesbaden, Germany, is responsible for detailed engineering, procurement of equipment and material, construction and civil work, and construction management including commissioning. The project will be implemented on a fast-track schedule, with start-up planned for early 2009.

▶ www.abb.com

Sound Science And Crystals

Improved Crystallization and Particle Engineering

Power ultrasound within chemical processing has particular importance in crystallisation control, including nucleation, size distribution down to micron-size and morphology. Drug microcrystalline particles for inhalation can also be prepared using new power ultrasound assisted technologies such as the Solution Atomisation and sonoXtallization (SAX) technology being developed by Prosonix in conjunction with the University of Bath, UK. This allows the production of spherical drug particles with superior geometrical, surface and performance properties.

Graham Ruecroft
Prosonix Ltd.

Pharmaceutical manufacturing is committed to making particles and then modifying their properties in order to turn them into structured products, but surprisingly 5–10% of manufactured formulations fail to meet specifications. Typically mesoscopic particles for drug inhalation are manufactured by some very primitive pharmaceutical technologies such as micronization; a "sledgehammer" and energy-inefficient technique to turn large, regular crystals into irregular 1–5 µm particles that can undergo morphological change and surface polymorph transformations leading to amorphicity and decreased stability. The particles can also be highly charged which undermines the flow-rates essential for aerosolised and dry powder inhalers.

We must learn to engineer such mesoscopic crystals, control their micro and macro structure and fully characterise their performance enhancing attributes. This will allow control of surface characteristics and surface geometry while maintaining high throughput, low cost and industrial scalability. Emerging crystallization and particle engineering technologies are now being developed to assist in both drug development and manufacture. The production of drug particles using supercritical fluids has generated significant interest, albeit with limited success to date. Questions are being asked about scalability, cost effectiveness due to high pressure, limited productivity and inherent amorphicity. Conversely, the SAX technology, developed in conjunction with the inventor, Dr. Rob Price of the University of Bath, avoids all these issues to give superior engineered drug particles.

Ultrasound And Crystallisation

Almost all chemical processes utilise crystallization – cooling, evaporative, anti-solvent or reactive – and can be one of the most difficult unit operations to control. Ultrasound is used routinely in areas such as medical imaging, diagnostics and biological cell disruption and now the application of power ultrasound (20–100 kHz) has risen to prominence in sonochemistry (modify chemical reactions) and sonocrystallization (nucleation via transient cavitation). The latter is particularly effective for primary nucleation and reproducibly generating microcrystalline seed crystals (to avoid conventional seeding). As a result, we can control crystal size distribution, morphology, impurities and solid-liquid separation. The in-line continuous flow or batch mode process can be applied to intermediates, excipients, APIs, binders and sugars and importantly can be validated across scale in current Good Manufacturing Practice (cGMP) environments.

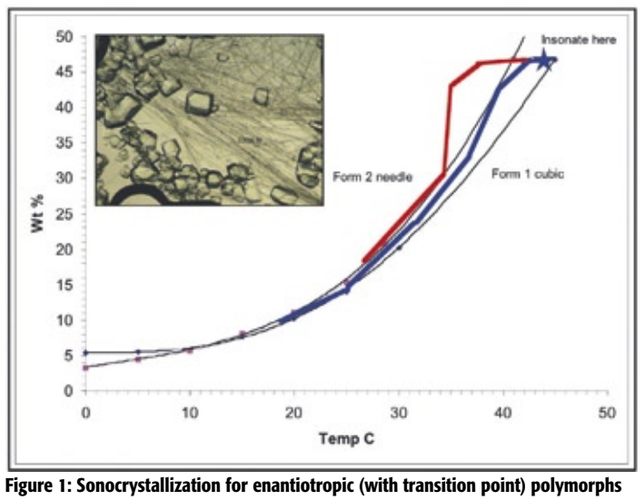

Figure 1: Sonocrystallization for enantiotropic (with transition point) polymorphs

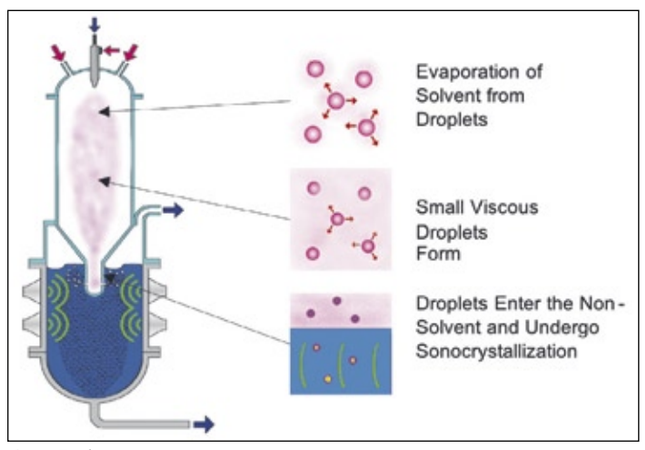

Figure 3: The SAX process

Polymorph Control

An understanding of the metastable zone (MZ) and the zone width (MZW) is fundamental to controlling crystallization. The application of high-intensity 20 kHz ultrasound can lead to narrowing of the MZW and by doing so it is possible to "tailor" a crystal size distribution using a short burst of ultrasound to nucleate at low supersaturation and then allow growth to large crystals, and the production of small crystals or more crystalline phases with different packing in the crystal lattice. Isolation of the "wrong" polymorph brings substantial problems in pharmaceutical applications but by careful application of ultrasound the ground state polymorph (the most thermodynamically favoured and least soluble) can be isolated.

For example, in a system that exhibits enantiotropic polymorphism (fig. 1) sonocrystallization, using a pilot scale recirculation system (~500 l crystallizer and 5 l Prosonitron), allows us to prepare the thermodynamically stable polymorph (cool along blue line), which has cubic type crystal habit, at low supersaturation. Conversely, at high supersaturation (cool along red line) fast nucleation kinetics, along with poorly controlled crystallization, leads to the proliferation of the kinetic (metastable) polymorph, which has a distinct needle habit, and in turn results in poorly stirred slurries and variable product bulk density.

From Laboratory To Manufacture

One of the principal barriers to the adoption of power ultrasound technology in pharmaceutical manufacturing has been the lack of industrial scale equipment. To address this need we have designed industrial equipment to allow effective and focussed distribution of acoustic energy into a liquid by using a number of low-power transducers (now 21 in a 5 l flow-cell) bonded to the outside of a cylindrical duct. This avoids the problems of using high-powered probe based equipment where metal particles can be shed into the crystallizing liquor. Typical equipment for pharmaceutical manufacture fabricated from Hastelloy is shown in figure 2 alongside similar equipment, with the acoustic shield removed, where the piezoelectric transducers can be clearly seen. This equipment can be used as a recirculation or continuous flow-cell.

Figure 2: Manufacturing equipment for sonocrystallization

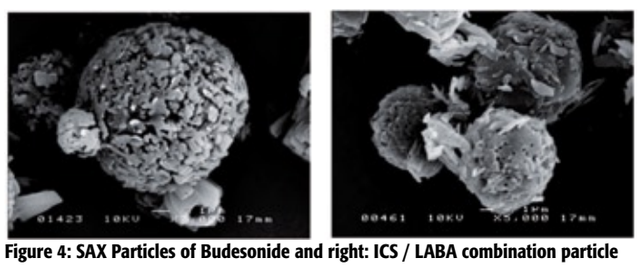

Figure 4: SAX Particles of Budesonide and right: ICS / LABA combination particle

The technology can be applied from kilogram to tonne scale for fine chemical and pharmaceutical manufacture. The value-added benefits arising can include identification of new process patents for individual products, thus securing and extending marketing timescales. Sonocrystallization can be applied at any stage in a product pipeline; the scale-out feature of the technology ensures that success in the lab can be replicated across scale.

SAX is a sonocrystallization technique for production of particles with optimum size and morphology suitable for formulation where microcrystallinity is essential. We have seen specific benefits in the production of particles for inhaled therapeutics, and also see potential in the production of nanosuspensions, pharmaceutical co-crystals and combination-based products. SAX allows production of spherical particles (fig.4) with a well-defined size range and with control of the macroscopic morphology, including polymorphism and surface topology. These properties are invaluable in defining aerodynamic properties of particles, shelf life, stability, bioavailability and efficacy. It is particle geometry that is the central design principle in controlling surface forces and hence interfacial interactions. SAX aims to control the particle geometry, morphology and surface properties by a technique that is simple in philosophy but not without its challenges in terms of underlying physics and more active pharmaceutical ingredients (API) or API and excipient such as lactose. These particles should have a high degree of crystallinity with respect to both ingredients. Often the two drugs have synergistic action and need to be delivered in an exact ratio such as in inhaled corticosteroid (ICS) and long acting beta agonist (LABA) formulations (fig. 4). For optimal interaction, the two drugs must be delivered to the same site of action in adequate doses since the synergistic action may be reduced with variable ICS and LABA doses. SAX introduces the potential for a novel particle engineering solution whereby a single droplet containing the two APIs in an exact ratio can be converted to a particle containing the very same drug substances as separate crystalline entities. Indeed triple therapy should be possible with SAX.

Horizons

Power ultrasound can be applied to crystallization at manufacturing scale and now in technologies to produce micron-sized particles for drug inhalation. Sonocrystallization can become a core technology in the pharmaceutical industry, and we can expect to see many more industrial applications in the near future. Power ultrasound has a significant part to play in pharmaceutical particle science.

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Playing It Safe

The Three Golden Rules of Waste Disposal Logistics

The disposal of residues is of primary importance for industrial companies, especially as it represents an important part of the production process where residues occur on a regular basis. Residues are collected in different receptacles that are continuously replaced to avoid down time. It is necessary to have a sufficient number of empty containers on hand; that they are delivered to the production facilities on time; and that the containers with residues are disposed of safely and according to standards and regulations. To ensure the hassle-free disposal of their production residues, many companies commission a specialised provider to handle their waste disposal logistics. Only providers who fulfill the following three substantial conditions can guarantee that the entire disposal process is efficient and safe.

Chemion's new container terminal at the Chemical Park Leverkusen is used for storing cleaned and not cleaned empty containers.

Disposal logistics require professional know-how and special equipment.

First Condition: Know-how in the Handling of Hazardous Goods

Handling hazardous materials is part of the daily business of Chemion Logistik, which specialises in logistics for the chemical industry and related sectors. This qualifies the logistics service provider to offer waste disposal logistics. Wastes are often toxic, corrosive or inflammable. This is why the providers of waste disposal services are required to have certified expertise in the handling of hazardous goods. This includes solid know-how of the materials, technologies and processes, as well as of all relevant safety rules and regulations. Due to their properties, liquid or solid wastes require the use of special technical equipment that is tailored to the different classes of hazardous materials. If the service provider is experienced in handling hazardous goods, they are able to safely provide different individual services along the disposal logistics chain. For example, the provider checks whether the container material is compatible with the equipment and the residues that are to be filled into the containers. The provider knows how to handle certain liquids, contaminated materials, or excavation materials. Also, the provider complies with the rule of only filling tank containers to 80 % of container capacity in order to prevent dangerous surging during transit, which increases the braking distances of the truck.

Second Condition: A Comprehensive Service Portfolio

The choice of the correct container depends on the material, the mode of transportation, the disposal technique, and, last but not least, the disposal site. As residues, the mode of transportation and disposal technique can vary – and many different combinations are possible – every logistics process is different and depends on what the customer wishes and what safety regulations require. Therefore, the logistics service provider has to plan each waste disposal project individually and in detail to find the optimal logistics solution. This can only be done by full-service providers who cover the entire spectrum of logistics and are able to combine individual services for a disposal project as needed. It is not uncommon for tank containers to be delivered by railroad to a terminal and stored there until they are being shipped to the final disposal site.

Another example is the transfer of dumpsters from a wagon to a truck, because the landfill can only be reached by roads. These examples illustrate that the service provider must have access to a range of active and passive operating material in order to provide the suitable container for every residue. Providers can meet this requirement if they partner with others in a network that gives them the necessary flexibility in equipment management. A well-connected full-service provider can efficiently handle the entire waste disposal logistics chain by creating a seamless process that includes transport, loading and unloading, and the storage of containers with residues.

Third Condition: Familiarity with the Site and its Processes

Logistics companies that are full-service providers can also handle all of the time-consuming tasks that occur at a site in connection with the disposal of residues. It creates additional benefits for the customers when the service provider knows the site well and maintains close contact with the production facilities and the management of the industrial park – on two levels. The logistics service provider knows the processes and the facilities of the companies and is able to pick the type of container whose design fits the production plant and the disposal facility, respectively. Also, when the service provider works hand-in-hand with the operators of disposal plants, the administrative and organisational efforts can be reduced significantly.

For instance, at the sites of Leverkusen, Dormagen and Krefeld-Uerdingen, Germany, the logistics company Chemion uses the disposal facilities of Bayer Industry Services (BIS). The cooperation of the two companies allows customers to receive disposal services from one single source. BIS is connected to the companies at the chemical parks via an order placement system in which customers can request services in an easy and quick way. All details are then coordinated between the two service providers, who submit an offer to the customer, and later a joint invoice. The cooperation between logistics and disposal is seamless, and the customers can be sure that the entire process runs smoothly, from ordering the containers, transportation, loading and unloading, and storage, to eventually the disposal and cleaning of the containers.

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Emerson, Mtelligence Form Alliance

Emerson Process Management and Mtelligence Corporation have formed an alliance between Emerson's PlantWeb digital plant architecture with AMS Suite and enterprise asset management (EAM) systems such as SAP's Plant Maintenance system and IBM's Maximo system. The alliance is to bridge the gap between operations and maintenance, helping process manufacturers perform advanced condition-based maintenance as well as optimised production planning. Mtelligence's technology provides an easily implemented, bi-directional bridge to connect plant asset management information with EAM systems based on the Open O&M (Operations and Maintenance) Initiative. The Open O&M Initiative specifies how plant predictive maintenance systems, such as Emerson's AMS Suite, interact with EAM systems. The use of industry standards ensures uniform interfaces and shields users from upgrade and migration risks that plague proprietary connectivity solutions.

▶ www.emerson.com
▶ www.mtelligence.net

Uhde to Build Complex in Thailand

Thai Oleochemicals Company and Thai Fatty Alcohols Company have jointly commissioned Uhde to build a turnkey plant complex for the combined production of biodiesel (methyl ester) and fatty alcohols at Map Ta Phut, an industrial location some 150 km south-east of Bangkok.

The contract is for a 200,000 t/y methyl ester plant and a fatty alcohol plant with an annual capacity of 100,000 t. The scope of the contract includes the engineering, the supply of all materials and equipment, the construction and supervisory services. The contract is worth some €95 million.

The methyl ester plant will be based on a process licensed by AT Agrar-Technik of Schlaitdorf, Germany, while the fatty alcohol production process will be supplied by Düsseldorf-based Cognis Deutschland. A key feature of AT Agrar-Technik's esterification process is its flexibility with respect to the feedstocks which can be used, allowing a variety of oil-bearing plants, animal oils and fats and old vegetable oils to be processed. The main feedstock for the new plant complex is to be palm oil from Thailand and other South-East Asian countries. The processing of used cooking oils in the plant is also planned for the future. The methyl ester plant is due to come on-stream in late 2007, followed by the commissioning of the fatty alcohol plant in January 2008.

▶ www.uhde.biz
▶ www.biodieselanlagenbau.de
▶ www.cognis.com

Technip Awarded Contract in Colombia

Technip has been awarded by Ecopetrol, Colombia's state oil company, a project management consulting (PMC) contract worth approximately US-$50 million for the expansion of its refinery in Barrancabermeja, Colombia. The contract covers front end design, detailed engineering and procurement services for the process units, as well as supervision of contractors' activities for engineering, procurement and construction (EPC). Technip's operations and engineering centres in Rome (Italy) and Bogotà (Colombia) will execute the contract. The project includes: a 19,000 barrels per stream day (BPSD) gasoline hydrodesulphurization unit and a 57,000 BPSD diesel hydrodesulphurization unit; a 19,000 million f³ per day hydrogen production unit; a 55 t/d sulphur recovery unit; a 110 t/d tail gas treatment unit; a 500 gallons per minute (GPM) sour water stripper; and a 30 GPM diesel/gasoline amine regeneration unit. The project is scheduled to be completed in the fourth quarter of 2009.

▶ www.technip.com

Jacobs Wins Contracts from Bayernoil

Jacobs Engineering Group announced that a subsidiary company received two separate contracts from Bayernoil. Under one contract, Jacobs will provide a range of engineering services to help upgrade Bayernoil's refineries in Germany as part of a major restructuring program. Jacobs will perform this work from its office in Cologne. Under a separate contract, Jacobs will provide its proprietary sulphur recovery and low temperature SCOT technology to Bayernoil for a new process unit at their refinery in Neustadt, Germany. This will ensure full compliance with stringent, new national and EU regulations regarding sulphur emissions. The company will execute the engineering work from their office in Leiden, The Netherlands. Details of neither contract were disclosed.

▶ www.jacobs.com

Asahi Kasei Announces New Plant

Asahi Kasei Electronics (AKE), a full subsidiary of Asahi Kasei, has begun full commercial operation of a new plant for compound semiconductor wafer processing. The new plant shall play a key role as a base for production of high-performance Hall elements for use in cell phones, consumer electronics, automotive, and an expanding range of growing application fields, and will serve as the core for new business development in the field of compound semiconductor thin film devices.

At the new plant, gallium arsenide (GaAs) wafers are processed to form high-performance Hall elements and other compound semiconductor devices. According to the company, the performance of Hall elements produced at the new plant is far superior to that previously available, particularly in terms of temperature dependency and sensing precision.

▶ www.asahi-kasei.co.jp/asahi/en

Chemtura Forms Mid-east Distributorship

Chemtura Corporation's Petroleum Additives business group has named Aviation Technology and Turbine Services (ATTS) of Marlton, New Jersey (USA), as exclusive distributor of its Hybase line of magnesium sulfonate fuel additives (M-14D and derivatives) in Saudi Arabia, United Arab Emirates, Bahrain, Qatar, Yemen, and Oman. According to the company, Hybase magnesium sulfonate fuel additives are highly effective at reducing SO_3 emissions and controlling corrosion in gas turbines and other power generation units burning heavy fuels.

▶ www.chemtura.com
▶ www.attsworld.com

Air Products Adds WF6 Capacity

Air Products is expanding tungsten hexafluoride (WF6) capacity at its electronic specialty material manufacturing facility in Hometown, Pennsylvania (USA). The new capacity will come onstream during the first half of this year. The expansion enables Air Products to produce 60 % more WF6 for the semiconductor industry, in particular, memory chip manufacturers. The new production unit will be an exact duplicate of Air Products' existing production capabilities, including all nickel construction with automated process systems and a proprietary distillation process to remove impurities. There will be no change in raw material supply, and Air Products will continue to ship finished product in non-reactive nickel cylinders to prevent metallic impurities from contaminating the product.

In the semiconductor industry, tungsten is used to construct vias, which connect two layers of aluminum that are separated by a dielectric layer.

▶ www.airproducts.com

Veolia Water Wins China Contract

Veolia Water has won a contract in China for a 30-year concession with the Lanzhou Water Supply Company in the capital of the Gansu Province, on the banks of the Yellow River. The contract was awarded by local authorities through an international tender for the acquisition of 45 % of the municipal water company. At this level of participation it would generate for Veolia Water an estimated cumulated total turnover of €1.6 billion.

The company will manage four water treatment plants with a global capacity of 2,190,000 m³, 640 km of distribution network (960 km with connections), 11 elevation plants, and associated client services. The company employs 2,200 employees. Operations will start in the middle of 2007.

▶ www.veoliawater.com

Praxair to Supply SMIC Wafer Plant

Praxair China and Semiconductor Manufacturing International Corp. (SMIC) have signed a contract for Praxair to supply industrial gases to SMIC's new FAB 8 facility in Shanghai, China. Praxair will upgrade its existing facility and pipelines in the Zhangjiang Hi-Tech Park to supply ultra-high-purity nitrogen, oxygen, argon, hydrogen and helium to the semiconductor plant. Praxair will also build and operate the purification and gas-monitoring systems located on the site.

▶ www.praxair.com
▶ www.smics.com

chemanager@gitverlag.com

Take Cincinnati

Opportunities for Companies Abound in America's Midwest

According to recent surveys, the U.S. is the most attractive biotech marketplace, the biggest manufacturer of medical and biotech products and the leading innovator in drug development. The life sciences industry has increasingly moved away from Europe and towards the U.S. This begs the question, "What should a medium-sized European company do to defend its successful position in the global marketplace?" Girindus, an active ingredient manufacturer from Bensberg, Germany, solved this challenge in 2001 by leaping across the Atlantic Ocean to open a U.S. manufacturing site.

The pharmaceutical industry's worldwide sales total US-$600 billion. The development of new active substances is booming, while research and development as well as sales and marketing have long since crossed borders. Multinational companies dominate this highly dynamic market. Acquisitions and sales both last year and in the current year have received much attention. But despite all the talk of internationalism, national structures, regulations and consumer behaviour paint a heterogeneous image.

Biotechnology and life sciences specialists are of interest and importance to the pharmaceutical industry, mainly because of their research experience. Already, more than a quarter of all newly developed drugs have their origins in biotechnology. Leaving the research stage and proceeding to more expensive clinical testing often puts high strain on the financial resources of biotech companies.

Girindus solved this challenge in 2001 by setting up another subsidiary in North America. The company has operated labs and pilot plants for five years in Cincinnati, Ohio, where the company produces active ingredients for preclinical studies and Phase I and II clinical trials. These activities are complemented by medical chemistry and radiosynthesis. Production of oligonucleotides was enlarged in 2005 with the financial support from the state of Ohio. Oligonucleotides are hoped to achieve a breakthrough in the fight against cancer, virus infections and inflammatory diseases. Girindus is one of the leading manufacturers of these active substances worldwide.

"The U.S. market has reached a higher level of development and innovation than the German or European markets," said Peter J. Bergsteiner, Girindus director of finance and investor relations. "The research-oriented biotech industry can access the capital markets more easily, and it is a potential customer of Girindus."

In 2005, biotech companies in Europe were able to obtain US-$3.3 million in subsidies, compared to US-$16 billion in the U.S. "Being in the pharmaceutical market, Girindus had to move to the market that counts," Bergsteiner said, summarising the motivation for investing in the U.S.

In the past few years, Europe has narrowed the gap in the number of biotech firms, and now counts 1,600 biotech companies, 200 more than the U.S. However, European companies employ only 45 people on average, roughly half as many as their U.S. counterparts (96).

U.S. Production: New Strategic Platform

Girindus had been represented in the U.S. by a sales office since 1986, but establishing its own production facilities opened up far-reaching opportunities. "Strategically, this step turned Girindus into an international supplier," Bergsteiner said.

How does a medium-sized company act on an international market characterised by a young history, great demands, high-tech products and a need for highly qualified staff? What does a medium-sized company have to bear in mind when "crossing the pond," and how can common traps be avoided? "Choosing the right location is essential in the U.S., which is 26 times the size of Germany," is Bergsteiner's advice.

Girindus: Right Time, Right Place

Following intense research, Girindus acquired a location from Aventis in Cincinnati. The company found that the Cincinnati region holds some special advantages. It is one of the top biotech regions in the U.S. This is where the states of Kentucky, Indiana and Ohio meet along the Ohio River, with the city of Cincinnati at its core. In a recently published ranking of the top 40 regions for biotechnology, Ohio was top with three metro areas, including Cincinnati, Cleveland and Columbus.

The region is home to more than 200 businesses involved in the research and production of pharmaceutical, environmental, medical and agricultural products. Procter & Gamble Pharmaceuticals, Kendle International, Amylin/Alkermes, LabOne and Ethicon Endo-Surgery Division of Johnson & Johnson comprise some of the leading U.S. companies in Cincinnati.

The Cincinnati USA biotech cluster is one of the top regions in the U.S.

Good Plans are Half the Battle

For medium-sized companies with limited financial resources, investing abroad requires a great deal of prudence: facing criteria in the focus when selecting a location:

- central location and market environment
- human resources
- infrastructure and transportation
- overall economic conditions

"The central location of Cincinnati USA is quite attractive," said Bergsteiner of the location chosen by Girindus. Customers in the region – pharmaceuticals, health sector, biotechnology, agricultural chemistry – are targeted by the life sciences industry. The region is the gateway to the highly industrialized Midwest, from which 44 % of all U.S. consumers and 43 % of all manufacturing locations can be reached by truck within a day.

Modernity is also symbolized by the architecture: Frank O. Gehry designed the Vontz Center at the University of Cincinnati.

Science and Research in the Market Environment

Even large national research institutions, such as the Forensic Chemistry Centre of the Food and Drug Administration (FDA) or the U.S. Environmental Protection Agency's National Homeland Security Research Centre are represented here. Also worth mentioning are the Vontz Centre for Molecular Studies and the Genome Research Institute, as well as the Centre for Bioinformatics and Functional Genomics and BIO/START, the leading biomedical business start-up centre in Ohio.

An agency working to help companies at the state level is Omeris, a service organisation tasked with promoting life science firms in Ohio. The agency cooperates with institutions statewide in order to promote Ohio as a biotech hub. Members include Batelle, the largest contract research institute worldwide, Cardinal Health, the world's largest distributor of drugs as well as hospital and medical equipment, and even the Cleveland Clinic, the leading U.S. clinic for cardiovascular diseases.

Human Resources And Education

About 1.1 million workers live in Cincinnati. 105,000 are employed as physicists, engineers, biomedical and environmental scientists and technicians, or as agricultural and food scientists, microbiologists, physicians, or health counsellors. More than 250 colleges and universities within a 300-mile radius add more than 140,000 young professionals to the workforce each year, including specialists for biomedical production. The Ohio Valley Affiliates for Life Sciences (Ovals), an alliance of various universities, promotes life science research and offers a network for biotech institutions.

The University of Cincinnati ranks among the top 20 % of the 151 major U.S. research institutions. "The University of Cincinnati has a good reputation, therefore, it is easy to attract talented people and find good staff," Bergsteiner explained. "For example, one of the substances we offer for cosmetics is based on research conducted by Cincinnati Children's Hospital, which is a leader in dermatology, with a significant research budget."

One of the World's Best Airports

Interstate highways, efficient train stations and inland harbours provide links in all directions and to the whole country for transportation of goods. Leading courier services are based near the Cincinnati/Northern Kentucky International Airport.

"Since we can fly non-stop to all parts of the U.S., every one of our business trips is completed much faster, saving us time and money" Bergsteiner said. Every day, 450 non-stop flights take off for 120 cities around the globe, with European destinations including Amsterdam, Frankfurt, London, Rome and Paris. It was selected number one in the U.S. by passengers for the 11th time in a row.

High Tax Privileges Improve General Conditions

To promote new investment, especially in the manufacturing industry, Ohio adopted a tax law in 2005 which favours companies and taxpayers alike. Organisations that especially benefit from the tax changes are those shipping product outside Ohio's borders and those companies with large investments in machinery, equipment or inventory. Personal property taxes will be reduced to zero over the next three years and a commercial activities tax will replace the corporate franchise tax.

Cincinnati's status as a foreign-trade zone adds to the attractiveness of the location for international commerce which profits from low import duties and taxes. Numerous economic development programs and strategy consulting activities at the county and local government level support the establishment of new companies or the enlargement of existing ones.

"We feel that Ohio is a positive and friendly to business. Our decision to locate there has helped us quickly grow our business," Bergsteiner said. "Since we invested in Cincinnati USA, our customer base has increased, and trust has grown."

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ICI Invests In China

China ICI has broken ground for the construction of a new research and development centre in China as part of its strategy to grow aggressively in the country and the Asia Pacific region. The ICI China Technology Centre (CTC) is being built on an existing ICI site at Songjiang near Shanghai, and is scheduled to be fully operational in late 2007 with a staff of about 70. The CTC will be a single facility to serve ICI's corporate technology needs as well as those of a number of its business units – Adhesives (part of National Starch and Chemical Company), and ICI Paints decorative and packaging coatings. An additional part of the facility will be shared laboratories. It will be an important research hub within ICI's global R&D network and support all ICI businesses, and will lead links with and collaborative work with universities in China. Construction and equipping the five-storey building is expected to be completed within two years.

▶ www.ici.com

UCB Expands To Canada

Prince Philippe of Belgium officially inaugurated UCB Pharma Canada at a ceremony held in Toronto. On this occasion UCB Pharma Canada shared its plans for growth in Canada. Research at UCB is focused in the areas of central nervous system disorders, immune and inflammatory disorders, allergy and respiratory diseases, as well as oncology. Based in Burlington, Ontario, UCB Pharma Canada shall endeavor to bring to Canadian patients treatment options that will help alleviate their often-debilitating conditions and provide them a better quality of life.

A key priority for UCB Pharma Canada will be to secure regulatory approval for UCB's new biotherapeutic agent Cimzia (certolizumab pegol). Phase III clinical trial results for Cimzia in the treatment of Crohn's Disease have encouraged a recent global expansion at UCB, of which the inauguration of its Canadian affiliate is a key element.

▶ www.ucb-group.com

Novartis to Build R&D Centre in Shanghai

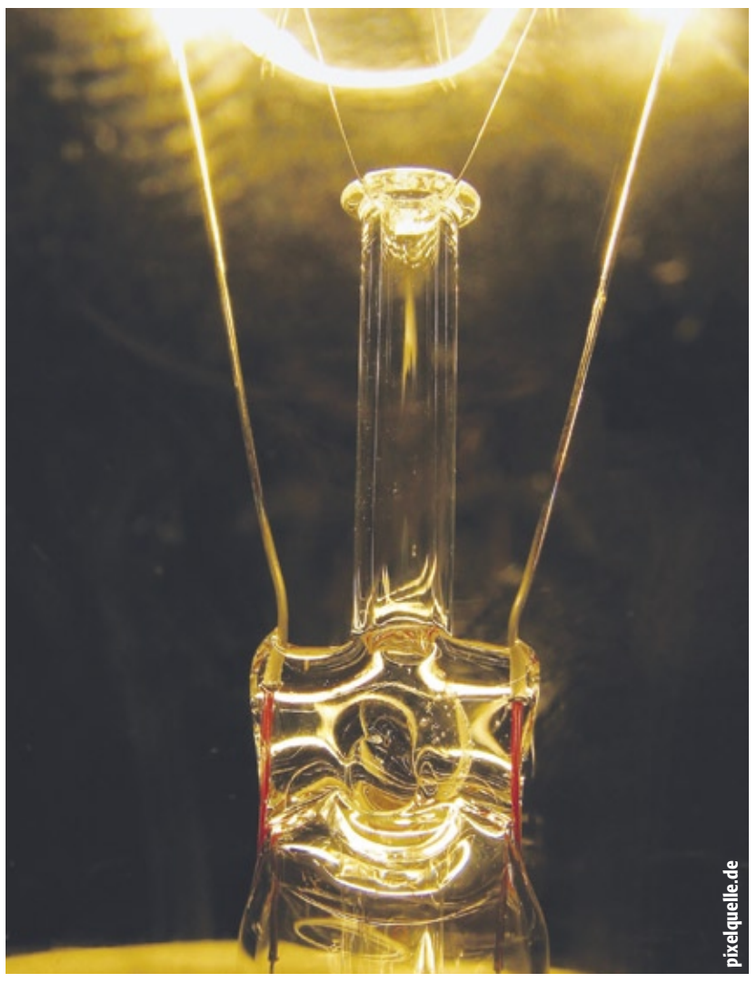
Novartis plans to build an integrated biomedical research and development centre in Shanghai's Zhangjiang Hi-Tech Park that will become an integral part of the group's global research and development network. Research and development activities at the site will initially focus on addressing urgent medical needs in China and Asia, particularly infectious causes of cancer endemic to the region. Scientists will initially work in a 5,000 m² start-up facility that is expected to open in May 2007. Construction of a permanent 38,000 m² facility for approximately 400 scientists will begin in July 2007. An investment of US-$100 million has been planned for the design and construction of the two facilities.

▶ www.novartis.com

Ambitious Targets

European Commission Proposes Energy and Climate Package

The European Commission has proposed a comprehensive package of measures to establish a new energy policy for Europe to combat climate change and boost the EU's energy security and competitiveness. The package of proposals set a series of ambitious targets on greenhouse gas emissions and renewable energy and aim to create a true internal market for energy and strengthen effective regulation. The Commission said it believed that when an international agreement is reached on the post-2012 framework, it should lead to a 30%-cut in emissions from developed countries by 2020. To further underline its commitment the Commission proposed that the European Union now commit itself to cutting greenhouse gas emissions by at least 20% by 2020, in particular through energy measures.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The Commission reported that there is a more than 50% chance that global temperatures will rise during this century by more than 5 °C. On current projections, energy and transport policies would mean that rather than falling, EU emissions would increase by around 5% by 2030. With current trends and policies the EU's energy import dependence will jump from 50% of total EU energy consumption today to 65% in 2030. In addition, the internal energy market remains incomplete which prevents EU citizens and the EU economy from receiving the full benefits of energy liberalisation.

The package proposed by the Commission is based on three central pillars:

1. A True Internal Energy Market

The aim is to give real choice for EU energy users, whether citizens or businesses, and to trigger the huge investments needed in energy. The single market is good not just for competitiveness, but also sustainability and security.

The competition sector enquiry (IP/07/26) and the internal market communication show that further action is required to deliver these aims through a clearer separation of energy production from energy distribution. It also calls for stronger independent regulatory control, taking into account the European market, as well as national measures to deliver on the European Union's target of 10% minimum interconnection levels, by identifying key bottlenecks and appointing coordinators.

2. Accelerating the Shift to Low-carbon Energy

The Commission proposes to maintain the EU's position as a world leader in renewable energy, by proposing a binding target of 20% of its overall energy mix will be sourced from renewable energy by 2020. This will require a massive growth in all three renewable energy sectors: electricity, biofuels and heating and cooling. This renewables target will be supplemented by a minimum target for biofuels of 10%. In addition, a 2007 renewables legislative package will include specific measures to facilitate the market penetration of both biofuels and heating and cooling.

Research is also crucial to lower the cost of clean energy and to put EU industry at the forefront of the rapidly growing low carbon technology sector. To meet these objectives, the Commission will propose a strategic European Energy Technology Plan. The European Union will also increase by at least 50% its annual spending on energy research for the next seven years.

At present, nuclear electricity makes up 14% of EU energy consumption and 30% of EU electricity. The Commission proposals underline that it is for each member state to decide whether or not to rely on nuclear electricity. The Commission recommends that where the level of nuclear energy reduces in the EU this must be offset by the introduction of other low-carbon energy sources otherwise the objective of cutting greenhouse gas emissions will become even more challenging.

3. Energy Efficiency

The Commission reiterates the objective of saving 20% of total primary energy consumption by 2020. If successful, this would mean that by 2020 the EU would use approximately 13% less energy than today, saving 100 billion euro and around 780 tonnes of CO_2 each year.

The Commission proposes that the use of fuel efficient vehicles for transport is accelerated; tougher standards and better labelling on appliances; improved energy performance of the EU's existing buildings and improved efficiency of heat and electricity generation, transmission and distribution. The Commission also proposes a new international agreement on energy efficiency.

The Commission will seek endorsement of the energy and climate change proposals during the Spring European Council and will come forward with legislation in light of these discussions.

European Chemical Industry Reaction

The European Chemical Industry Council, Cefic, said it welcomes important proposals of the European Commission energy package. Cefic also proposed working with European industry sectors to ensure a realistic share of renewables and biofuels in the energy mix.

Among initiatives presented in the energy package, Cefic supports the measures proposed to achieve truly competitive energy, the emphasis on energy efficiency and on security of supply, and the proposal for a European Strategic Energy Technology Plan in 2007. This Technology Plan is intended to speed development of low-emission technologies including carbon capture and storage and second-generation biofuels, in which the chemical industry has a crucial role to play. "Our products, processes and research capabilities are key to helping conserve energy, delivering energy more efficiently, developing renewable resources and reducing greenhouse gas emissions," said Cefic Director General Alain Perroy.

However, the many good proposals to build an effective European energy policy are countered by the Commission's proposal for further unilateral CO_2 reduction targets by 2020. The European chemical industry strongly supports the need to combat climate change through an impressive achievement in increasing its energy efficiency and reducing its CO_2 emissions. However, it believes further strong CO_2 reduction targets that have not been adopted by other major emitting nations will weaken the European industry's competitiveness within the global business environment without achieving effective environmental benefits.

"It has been recognised that EU leadership is not effective in achieving the environmental objective of curbing global greenhouse gas emissions – and thus limiting the global atmospheric increase to 2 °C – unless the European Union has followers among the world's biggest emitting regions," Perroy said. Cefic therefore calls on the EU to strive for an agreement among the world's biggest emitting countries and regions to combat climate change beyond 2012.

"We see a huge potential for a better energy policy in Europe that can also support EU's environmental goals. However, a sustainable energy policy must be built on three pillars: the economical, the social and the environmental ones," Perroy said. Cefic said it was surprised that major recommendations by the High Level Group on Competitiveness, Energy and the Environment – i.e. safeguarding the EU industry competitiveness – were not taken into account.

▶ www.ec.europa.eu
▶ www.cefic.be

Helm to Market Vinyl Acetate Monomer

DuPont and Helm signed an agreement for the sales and marketing of Vinyl Acetate Monomer (VAM). VAM is a key ingredient in the production of emulsions, resins, safety glass, paints, adhesives and coatings. The long-term agreement, effective January 1st, 2007, includes sales and marketing activities for DuPont's VAM outside the USA, Canada and Mexico.

▶ www.helmag.com
▶ www.dupont.com

Silanes: Unlimited Applications

PRODUCT Degussa is the world's leading producer of functional silanes. For more than 50 years, its Dynasylan brand name has stood for the investigation, production, and application of these materials. Degussa has now produced a brochure providing an overview over all available Dynasylan products. These are used worldwide in coatings, adhesives and sealants, plastics, cables, glass fibers, and pharmaceuticals, and in many other areas. The special chemical structure of silanes allows them to bond to organic as well as inorganic molecules. This has enabled them to become indispensable auxiliaries in a very wide variety of markets and applications; indeed, certain processes and products are no longer conceivable without the use of silanes. The areas of application of Dynasylan products are virtually unlimited. They are key components in adhesion promotion, crosslinking, and surface modification, and can act as dehydrating agents, co-monomers, co-binders, and reagents. The brochure provides an overview over the functionalities and application possibilities of Dynasylan products, including multifunctional silane systems. It can be downloaded from the website or ordered by email.

▶ Degussa AG
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www.dynasylan.com

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Chemicals

Industrial leaders take a look at what's to come in 2007

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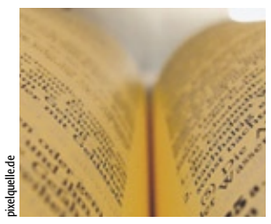

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Reach

Reach is now official, but what does the industry think?

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Pharmaceuticals

Patient Compliance through wallet packaging

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2006 Year In Review

The American Chemistry Council's Year-end Situation and Outlook

At the beginning of the fourth quarter of 2006, it was clear that the global economy remained relatively strong. Much of Western Europe had accelerated and China, India and many other emerging markets were growing at a strong pace, offsetting slowing growth in the U.S., Japan, and Latin America. Year-over-year (yoy) comparisons for global GDP improved from the 4.2% yoy pace in second quarter 2005 to 5% yoy for the first quarter 2006. Global monetary tightening and the withdrawal of liquidity by the major central banks characterised much of 2006. Current interest rates are still supportive of expansion but the pace is set to slow. Global economic growth appears to have reached its peak, with yoy gains slipping to 4.7% during the second quarter and 4.5% during the third quarter. Growth in world trade, while still strong, appears to have peaked as well.

Globally, inflation appears to have peaked as headline and core inflation measures in most countries have fallen since early summer. The pick-up in core inflation and wage growth was largely confined to the U.S. (due to tight labour markets) and a few other nations. Despite employment gains in Western Europe, growth slowed in the U.S., Japan and some emerging nations. As a result, global labour markets may not have tightened as rapidly as they did in 2005 and early 2006. Along with the recent decline in oil prices, slowing labour markets result in abated inflation fears and stabilised expectations. Although monetary tightening continues in China, India, and much of Western Europe, it appears to be complete in the U.S. and many emerging markets.

During 2006, yoy growth in global industrial production accelerated from 2005's soft patch in global manufacturing and from the effects of the hurricanes. This recovering activity is still aiding final demand for chemistry. Capacity utilisation is still rising – the consequence of low investment in many industries during the past 10 years. However, production in China and elsewhere in the Asia Pacific region has started to weaken and most industrial surveys have started to indicate moderation. The global industrial cycle will shed momentum.

After growing 5.3% (on a purchasing power parity, or PPP basis) in 2004 (the fastest pace since 1976), the global economy slowed in 2005 to a 4.9% pace. The consensus outlook was for global economic growth to average 4.7% in 2006 and moderate further in 2007 to 4.2%. The U.S. economy is clearly losing momentum and economic growth will be below trend as effects of the housing slump and end of mortgage equity withdrawal (MEW) affect other sectors of the economy. The light vehicle industry has softened as have industries tied to housing (carpeting, furniture, appliances, etc.). The slowdown in the U.S. will spread to other nations via trade mechanisms and a weakened dollar. Nations and regions at risk include those bordering the U.S. and many East Asian nations. The major question is whether the U.S. economy is entering a mid- to late-cycle slowdown – can a soft landing be expected, or are certain indicators harbingers of a hard landing? A cooling down of activity is widely expected, but a recession is not. A number of positive factors (falling oil and gasoline prices, continuing wage increases, strong corporate profits and balance sheets, solid household finances, additional capital spending, strong equity market, etc.) should allow the U.S. economy to decelerate to below-trend for a period. Global economic growth in 2008 is expected at 4.3%.

Risk Of Downturn High

Global industrial production fell from a gain of 6.3% in 2004 to 4.6% in 2005 as manufacturing activity hit a soft patch. However, during 2006 growth was exceptionally strong and was expected to average 5.7% before moderating to 4.8% in 2007. Growth in 2008 will improve slightly. Major growth centres continue to be China, other parts of Eastern Asia and some Central and Eastern European nations. Leading indicators of global industrial production suggest that the current growth cycle is peaking.

The risks of a sharper, more pronounced downturn, however, are relatively high. The falling U.S. housing market leading to a more serious retrenchment in the broader economy is perhaps the foremost risk. A rise in oil prices due to a supply shock could engender a global economic slump. A significant deceleration of activity in China (a major economic locomotive) is another threat, as are ever present financial market risks amid global imbalances. Finally, avian flu, terrorist attacks or other unforeseen events could dampen the global economy further.

Production Up 5.4%

Overall activity in the US-$2.56 trillion global business of chemistry has moderated as well. On a yoy basis, global production was up 5% in the third quarter, and excluding pharmaceuticals, production was up 5.4% yoy. Gains during 2006 were broad-based but largest in China, Asia Pacific, Africa and the Middle East and Central and Eastern Europe. The global business of chemistry is in a more mature phase of its cycle.

Global business of chemistry output will improve this year, increasing 3.8%, up from 3.3% in 2005 but down from 4.8% in 2004. Downstream inventory de-stocking appears to have run its course and global growth will improve to 4% in 2007 and then moderate to 3.6% in 2008. The most rapid growth will occur in Asia-Pacific (excluding Japan), Africa and the Middle East, Central and Eastern Europe and Latin America.

The U.S. business of chemistry has largely recovered from the effects of the hurricanes in 2005. A number of key thermoplastics are exhibiting strong year-to-date (YTD) comparisons, and most segments of the chemical industry have reached their past peaks. A recent build-up of downstream customer inventories should prove short-lived and from the hurricane-induced 0.3% decline in 2005, output was expected to improve to a 2.1% gain during 2006. Excluding pharmaceuticals, growth was expected to average 4.5% in 2006. Especially strong growth was anticipated in 2006 in a number of specialty chemical segments as well as in plastic reins and bulk petrochemicals and organic intermediates. Consumer products and crop protection also experienced stronger growth. Segments tied to housing and light vehicles such as coatings and synthetic rubber were expected to face challenges. Among specialty chemical segments, cosmetic additives, electronic chemicals, flame retardants, flavours and fragrances, food additives, foundry chemicals, and plastic compounding, among others showed strong gains.

Outlook for U.S. Chemical Industry 2007

Overall, U.S. chemical industry growth will improve to 3.2% in 2007 and moderate to 2.5% in 2008. In 2007, pharmaceuticals will take over as the growth leader as the more cyclical basic chemicals and specialties evolve to a more mature stage of the chemicals cycle, one consistent with growth closer to long-term averages. Non-pharmaceutical growth will decelerate from 4.5% in 2006 to a 1.9% gain in 2007. As the cycle further matures, growth will moderate to 1.2% in 2008. Continued recovery in volumes pushed overall operating rates to 76.7% in 2006. Additional output gains in combination with modest capacity additions will push capacity utilisation to over 78% by 2008.

From a regional perspective, the fortunes of the U.S. business of chemistry have been mixed. Output in the Gulf Coast region was clearly affected by the hurricanes during 2005. A recovery has occurred and positive yoy comparisons are now the norm for the Gulf Coast, as they have been in other regions for several months. Chemical industry growth will be regionally broad based during 2007 and 2008, with the Mid-Atlantic region (where pharmaceuticals are an important component) leading with 3.6% growth during 2007 and 3.1% in 2008. Following a recovery during 2006, growth in the Gulf Coast region will moderate to 1.9% in 2007 and 1.5% in 2008.

Volatile Natural Gas Costs

The U.S. business of chemistry faces some economic headwinds. A major risk at this point in the cycle is volatile natural gas costs. Although costs are off from their post-hurricane highs and down relative to oil, this is reflective of record storage levels, the result of mild weather during the past year. A comprehensive U.S. energy policy ensuring adequate and diverse supply – including that from Outer Continental Shelf (OCS) – would go far in moderating volatility and ensuring the competitive position of U.S. industry.

During 2006, high feedstock and other energy costs and improving operating rates resulted in higher chemistry product prices and contributed to higher shipment levels. As a result, shipments of the business of chemistry in 2006 were likely rise 5.6% to over US-$589 billion. Continued expansion of production through the next couple years will push shipments to US-$618 billion and in 2007 and US-$636 billion in 2008.

In 2006, U.S. exports of chemistry products were likely rise 11% to US-$132.5 billion and imports were expected to increase 13.3% to US-$145.3 billion. As a result, the trade deficit in chemistry will expand from US-$8.8 billion in 2005 to US-$12.8 billion in 2006, another record. Looking at trade on a segment basis, there will be an improvement in the balance for agricultural chemicals, polymers, surfactants and many specialty chemical segments (adhesives, catalysts, coatings, plastic additives, etc.). Trade of other basic chemicals will still largely be in surplus but will be offset by continued deficits in pharmaceuticals, consumer products, fine chemicals, and other specialty chemical segments. Continued growth is expected overseas and the value of the dollar will continue to moderate. As a result, the demand for U.S. exports is expected to rise. Geographically, the trade balances continue to improve with Canada, Mexico, Latin America, and most of Asia-Pacific. However, the trade deficits with Western Europe, Central and Eastern Europe, and Africa and the Middle East will worsen. Noteworthy is that the United States now has a trade deficit in chemicals with China. During 2007, the trade deficit will further deteriorate before improving slightly in 2008.

As a science and technology, knowledge-based endeavour, the business of chemistry invested US-$24.3 billion in research and development (R&D) in 2005. Spending gains will be modest, with R&D spending reaching US-$27 billion in 2008. Spending for development and applied research will be dominant.

Capital spending cycles generally lag cycles of industry activity, and improving profit margins set the stage for moderate increases in new plant and equipment (P&E) investment. Improving capacity utilisation rates triggered renewed capital spending by the industry this year. Spending will have increased nearly 9% to US-$25.6 billion in 2006. As the current investment cycle further enfolds, capital spending will increase to US-$28.5 billion. Drivers include spending for production expansion for existing products, replacing worn-out plant and equipment, and towards improving operating efficiencies. In summary, the U.S. and global economy are slowing. This will provide an environment for the business of chemistry in which production will continue to increase, albeit, at a diminished pace.

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See interviews page 12

Industry Outlook Prior to Informex USA

Industry Leaders Discuss Success for the Future

The American Chemistry Council's year-end situation and outlook was released in December and presented on page 11 indicates that global economic growth has reached its peak and will slow down in 2007. However, a soft landing is expected to be the most likely scenario. At the beginning of the new year, economic reports were staggering between pessimistic and optimistic. On the positive side and on a global scale, the drop in oil prices will aid economic prospects, and some leading economic indicators continue to point to additional growth. In addition, some regional markets still growing at a strong pace will be able to offset slowing growth in other regions. What does that mean for the chemical industry and how do global players prepare for future business success? Prior to Informex USA, taking place in San Francisco 13-16 February, CHEManager Europe asked several industry experts to comment on some of the statements given in ACC's report and share their opinion with our readers. Here is what they replied.

Stephan Borgas
CEO of Lonza, Switzerland

Joe Principe, Vice President Global Business Development, Degussa Exclusive Synthesis and Catalysts, U.S.

Dr. Wilhelm Stahl
Head of the Business Line Pharma of Saltigo, Germany

Aslam Malik
President of Ampac Fine Chemicals, U.S.

Dr. Hendrik Baumann, Director Marketing & Sales, CU Chemie Uetikon, Germany

1. What are the most important issues that affect the future business success of your company?

S. Borgas, Lonza: From a company perspective the development of our talent, the training of our experts and also the recruitment of new employees will be the major challenges for Lonza in the next two years. As part of its expansion, Lonza is going to increase the headcount from currently 6,400 to 8,000 employees by 2009.

From an industry perspective, we build on the innovation power of our customers, as they drive our business with their success. We are concerned about governments and authorities around the world supporting fair competition with a balance between supporting the markets but also providing a comparable level of regulation that can keep an equal global playing field.

J. Principe, Degussa: For Degussa Exclusive Synthesis, the most important issues are related to the U.S. market, which continues to be the most important market for pharmaceuticals, in spite of rapid growth in Asia. In this context, the number of new chemical entities being developed and the decision to outsource manufacturing of these products are the two most important factors.

Increasing numbers of companies in India and China now offer to make the same products as European companies, and at a lower cost. Recognising this and the growing markets in these countries, Degussa decided to establish a business model that allows us to get to parts of the value chain where there is price pressure and at the same time maintain high quality and intellectual property protection. The business model we have established includes an R&D center in Mumbai, India, a cooperative arrangement with Hikal, a leading manufacturer of APIs, also in Mumbai, and the Degussa-Lynchem joint venture.

W. Stahl, Saltigo: The most important issue that will affect the success of Saltigo in the market place will be the sustainable ability to offer value adding services to our clients and to react to their changing demand in a competitive environment.

Our business environment will strongly depend on the success of the pharma industry to continuously develop innovative drugs and their outsourcing strategies or demands of custom manufacturing services. On the competitor side, we have seen many changes in the west recently and will see their effect in the near future. Competition from low-cost countries will continue despite strongly rising cost in those countries.

A. Malik: It is clear that the global market is evolving at a fast pace. The competition from Asia is moving quicker than anyone predicted and we anticipate that many customers will outsource early steps of their chemistry to this part of the world. The custom chemical business is still very diversified, and we believe that the consolidations we have seen will continue over the next few years in order to streamline costs and improve manufacturing capabilities.

H. Baumann, CU Chemie Uetikon: The ever-increasing prices of feedstock and energy are causing worry, as well as the current U.S. dollar/euro exchange rate. That plays a critical role in an industry that is export oriented. The market for pharma and fine chemicals cannot tolerate any price increases; therefore, companies must absorb a part of the rising costs themselves.

Other risk factors for European manufacturers are still the undampened EU regulation and the unlevelled playing field for manufacturers outside of the EU. The latest example of completely exorbitant demands from the EU is the compromise for Reach. Except for additional costs, the legislation brings nothing with it; there are no additional advantages for safety in the handling of chemicals.

2. What is your personal assessment of the situation, the review on 2006 and the outlook on 2007?

S. Borgas, Lonza: 2006 for us was an exciting and decisive year as it saw the transformation of Lonza towards a true life-sciences company. With the sales of its LOFO business and the IPO of its Polynt division, with the acquisitions of the Bioproducts Manufacturing Division of UCB, which is now Lonza Braine, and the mid-scale mammalian production facility in Porrino, Spain from Genentech (now Lonza Biologics Porrino) and with the announcement to acquire the divisions Research Bioproducts and Microbial Biopharmaceuticals from Cambrex Corporation Lonza made an important step in the delivery of its strategic shift towards life sciences. The excellent performance of all of Lonza's business has almost been lost among all of these changes.

In 2007 we will focus on the successful integration of those businesses into Lonza and ensure that our customers and partners will benefit significantly from the "new Lonza."

J. Principe, Degussa: After several difficult years, Degussa's Exclusive Synthesis business ended the year 2006 on a very positive note. This is attributable to several developments. As part of a strategic initiative involving the reconfiguration of our production assets, we sold our Raylo site located in Edmonton, Alberta, Canada, to Gilead Life Sciences and at the same time signed a long-term contract for the supply of raw materials and the manufacture of certain active pharmaceutical ingredients for Gilead products. Our internal efforts to reduce costs and improve service focus have begun to show results.

In general the market has improved and we are benefiting from it. We established the Degussa-Lynchem joint venture in Dalian, China. This facility has an excellent reputation for quality with its customers. And its commitment to safety, health and the environment has been recognised by the Chinese government. As a consequence of these developments, Degussa Exclusive Synthesis expects to continue to grow in 2007.

W. Stahl, Saltigo: 2006 was a very positive year for Saltigo and its pharma custom manufacturing business in particular. The restructuring initiated mid 2005 resulted in a reduction of fixed costs across all functions. This significantly improved earnings on sales.

For our pharma business the positive upturn of the market that started in 2005 proved to be sustainable also in 2006. We have seen in particular increased demands for clinical supply services, in particular for material produced under cGMP.

We have clear indicators that the positive market climate will continue into 2007. This is driven either by successful clinical development projects for some clients or by an increasing outsourcing trend at other customers.

H. Baumann, CU Chemie Uetikon: After several years of weak growth in the pharmaceutical and fine chemicals industries, we're finally seeing a slight easing of tension and moderate growth. The pharmaceutical pipelines are filling again, which is reflected in the rising number of new projects and inquiries. 2006 can go down in the history books as having been a positive year; particularly turnovers developed well. We expect these trends to continue in 2007.

3. What is your strategy to prepare for the slowing growth of certain market segments and benefit from other sectors?

S. Borgas, Lonza: Lonza has tightened its portfolio and concentrates on growing and technology-intensive life sciences markets. Lonza manages the costs by focusing on high-performance locations. In addition, we continue to strongly invest into research and development.

W. Stahl, Saltigo: The market has been constantly changing and will continue to do so in the future. It will be crucial to identify new trends early and react immediately to the changing demands of our clients.

A. Malik, Ampac Fine Chemicals: AFC is a cGMP custom manufacturer of regulated intermediates and APIs using special technologies. In order to maintain the continuous growth rate that we have been experiencing over the last few years, we are constantly investing in our business and expanding our offerings in terms of specialised chemistry and engineering expertise. We offer three major technology platforms: Energetic Chemistry, HPAIs, and Multi-column Continuous Chromatography.

AFC's strategy is to maintain a strong leadership position in each of our three major technology platforms by focusing on innovation and by continuing to recruit highly qualified chemists and engineers. We believe that the expertise offered by AFC in our three major technologies, provide the company with the unique abilities that are needed to compete successfully in the fine chemical industry. We are also building on our heritage and are offering our expertise and experience in continuous processes to our customers.

H. Baumann, CU Chemie Uetikon: A broad diversification of our businesses enables us to maintain a certain basic level of plant utilisation. We expect positive effects to come from the constant enhancement of processes, long-term investment programs and selective investments in new business areas, such as biotechnology. Our product mix is also continuously monitored and modified as necessary. We also have other strategic advantages due to close customer relations, which gives us flexibility and the ability to react quickly to their needs.

J. Principe, Degussa: The industry remains highly fragmented. There are a fairly small number of fully integrated supplies and a large number of niche suppliers. We anticipate continued consolidation in the industry and expect a significant amount of our growth to come through capturing additional market share. In the long run, China will be become an attractive market, and we expect that with our current asset strategy we will be well positioned to serve it.

▶ www.degussa.com

4. What is your investment strategy in terms of regional expansion, R&D and new production capacities?

S. Borgas, Lonza: Apart from the already mentioned acquisitions Lonza invests continuously in its existing production and R&D sites. Four examples:

- In spring 2006 Lonza unveiled a significant investment plan to enhance its existing production and development operations in Nansha Guangzhou, China.
- In 2007 the two new 15,000 litre production trains for microbial biopharmaceuticals in Visp, Switzerland, will be fully on stream.
- In Singapore, two large-scale mammalian production facilities are being built by the Lonza Group. The two 80,000-litre plants will have four bioreactor trains, each with a flexible capacity of 1,000 to 20,000 litres. With the facility in Singapore, Lonza gains a further foothold in the growing and important Asian market. This will be the first large-scale biopharmaceutical manufacturing facility in south-east Asia.
- Our R&D platform in Slough/UK is growing organically but at a quite high speed since mid 2005. Recently we have expanded our laboratory and small scale production capabilities there.

▶ www.lonza.com

W. Stahl, Saltigo: Saltigo has initiated several investments in 2006 to react to the changing demands of our clients. We are upgrading and enhancing an existing plant to become a multipurpose cGMP plant with a total capacity of 43,000 litres. The new facility will come online in the second quarter of 2007.

To further expand our technology platform we have we are now running a 6,000 litre high pressure hydrogenation unit under cGMP. In addition, we have also set up an additional low temperature unit that will enhance our capacity to perform low temperature chemistry a large scale.

We have also added several more R&D labs and invested to upgrade our small scale pilotation facility.

We will continue to invest and improve our capabilities and portfolio of services according to the changing needs of our clients.

▶ www.saltigo.com

A. Malik, Ampac Fine Chemicals: The majority of AFC's business is based on the commercial production of registered APIs and intermediates. However, a growing percentage of our business involves variety of projects in Phase I and later phases. We specialise in the development of commercially viable processes. Specifically, processes that utilise AFC's core technologies in one of their production steps. Consequently, we bring the most value to our customers when the process is still in development, and when improvements and changes in the synthesis route are still possible. Over the next few years, we plan to substantially increase our Process Development and Engineering group to significantly augment the percentage of revenues derived from early drug development projects.

▶ www.apfc.com

H. Baumann, CU Chemie Uetikon: A long-term investment program against the cyclical trend is the foundation of our success. The cornerstone for our success today was laid in 2002 when we opened a modern multipurpose plant. This plant has since been approved by the U.S. Food and Drug Administration and enjoys great popularity among our customers. We are now planning to complete the plant by adding increased capacity.

Technologically, aside from increasing the pressure-reaction capacity, we will also be getting into low-temperature reactions. We are therefore able to increase our spectrum of offered reactions and set ourselves apart. After this investment is completed in 2008, we will have a look at other decisions for the future.

Then there will be questions to answer about future positioning, particularly with an eye on the growing Asian market. The potential there is already obvious today.

▶ www.uetikon.com

The next issue of CHEManager Europe will be published on 28 February

chemanager@gitverlag.com

Focal Point: Life Sciences

BASF Intermediates Develops New Chemical Entities

Continued Page 1

America? How do you respond to customer requirements?

F. Stein: We have been strengthening our team and, consequently, our pipeline of new projects has been growing steadily. The market appreciates that we are fast, flexible and market-driven. The special challenge we are confronted with in the NAFTA region is the life science industry. Nine of the 15 leading pharmaceutical companies serving world markets are headquartered in the U.S. They look for regionally based service, and with our emphasis on life sciences and our ability to supply from laboratory to industrial-scale quantities, we are positioned to offer decisive advantages to these companies. The U.S. is also home to numerous start-ups and mid-sized pharmaceutical companies, which appreciate our expertise in pursuing registrations, conducting analyses, toxicology and ESH.

"We analyse the market and identify possible customer needs"

Dr. Frank Stein, head of New Business Development NAFTA of BASF's Intermediate Operating Division

Working around the world, have you noticed differences in needs of customers in Europe and the U.S.?

F. Stein: There are no major differences in the needs of our contact partners around the globe. Responsiveness plays a major role in all regions; therefore, we act with highly qualified teams. Our team members must be capable of acting speedily with precision, to be open to new ideas and to possess the ability to understand chemical contexts in depth.

One example is the importance of on-time delivery of samples for drug development. In order to further improve our service, we implemented new sample workflow compute software in early 2006. It enables us to track each phase of the process from production to recipient, but it also sets off alarms if a step is missed. As a result, our samples arrive more quickly and our team can solve problems that may occur on the way.

In Germany, BASF has traditionally worked with universities and scientific institutions to foster innovations. How do you establish such relationships in the U.S.?

F. Stein: It is one of our basic principles to enter into partnerships, whenever this enables us to achieve our goals in a more efficient and effective way, this means to get things done more quickly. We look for – depending on the problems to be solved – first-class institutions that complement our expertise. In the U.S. we also have established cooperations with scientific institutes and universities. An outstanding example is our cooperation with the University of Alabama with regard to using their patents on ionic liquids for dissolving and processing cellulose. The business model forming the basis for this work recently received the Licensing Executive Society Award in the U.S.

In addition to "academic" collaborations, the cooperation with application technology partners guarantees a development process in line with market needs and quick-to-market principles. Can you cite examples of such partnerships that have led to actual products?

F. Stein: Yes, we work with several companies and institutes on applications. The Hanson Group, an added-value reseller, exemplifies such a success story excellently. Hanson has considerable application expertise and good market access. Our relationship led to the joint development and marketing of application-ready modified isophorone diamine (mIPDA) for polyurea applications in less than one year. The chemical is being so well received in the marketplace that we foresee a multitude of new possibilities for mIPDA. The idea for the product's development originated in a workshop conducted together with Hanson. We organise such workshops routinely with selected partners.

What major industrial sectors in the U.S. are currently keeping New Business Development busy?

F. Stein: The U.S. is a particularly innovative market and is, therefore, clearly in our focus. One focal point is the life sciences industry, where inquiries cover a broad range of products. To a large extent these inquiries deal with chemical building blocks that are not yet commercially available and very sophisticated to manufacture. We have the right production facilities and technology toolbox for various chemistries, a great benefit for our customers. Another noteworthiness of the NAFTA region is that we see unique and outstanding opportunities in the field of ionic liquids. In particular in the field of cellulose processing we do see several very attractive business opportunities. But also in the area of metal recovery and acid scavenging we are pursuing promising projects.

In life science applications, the Intermediates Division has created a one-of-a-kind business model with industry partners. What is it all about?

F. Stein: As already mentioned above, we have distinct business models for life sciences and industrial applications. They are sufficiently flexible to accommodate the respective customer requirements.

When we develop new processes and/or products for the life science industry, we take care that the intellectual property rights accrue to BASF. Usually our IP is included in the price/kilogram, meaning our customer is free to use the product for whatever they is interested in. If the customer so wishes, the IP can be exclusively exploited by them for a certain period of time, or we are prepared to negotiate corresponding license agreements. If a customer does not want exclusivity, we can market the process and/or product worldwide. The customer then will enjoy the benefit of large-quantity production, which usually allows for lower costs.

There is also a clear difference between us and enzyme providers, since we develop enzymes selectively and production-oriented – unless they are already part of our portfolio. Our goal is to manufacture robust, broadly applicable enzymes; it benefits not only the costumer, but the entire marketplace.

What business strategy have you adopted for the industrial applications unit?

F. Stein: We analyse the market and identify possible customer needs. Then we contact potentially interested companies and propose possible solutions to improve their business. On the other hand, customers also approach us with their problems. And we are always open to partnerships promising success for both parties. By constantly adopting focused industry know-how we identify those industries' needs. Thus, we more and more become the accepted partner for our customers.

Are there any examples of products that originated with New Business Development and were found suitable for both life sciences and industrial applications?

F. Stein: As a new compound class, ionic liquids are gaining wide acceptance in American industry. Particularly in cellulose processing, where we enjoy a strong and unique IP position, we have drawn strong interest for various applications in recent years. BASF has initiated projects in this area including cooperation with university research and development operations as well as joint developments with customers. Several promising business opportunities also exist in areas other than cellulose, for example in the life sciences industry. There we have licensed the Basil process to a U.S.-based customer.

Ionic liquids: phase separation in the BASIL process, above the product and below the ionic liquid. Using this process, the scavenging of an acid with a base results in a liquid salt instead of solid crystals that can cause problems in large-scale production. With so-called ionic liquids, time-consuming and expensive filtration is no longer necessary.

What are the current key trends in chemical intermediates that will have a significant impact on future technologies?

F. Stein: As "The Chemical Company" we have the advantage of the world's largest technology platform and are, therefore, best positioned to capitalise on many trends. One example is the white biotechnology sector. Biocatalysis for the synthesising standard and special intermediates for industrial applications continue to gain importance.

Will biocatalysis then become even more important to the products and processes of tomorrow?

F. Stein: Until now biocatalysis has been used for the production of chiral products, which we market under the ChiPros brand to pharmaceutical companies. Biotech steps in pharmaceutical applications are known as red biotechnology. The trend is, however, also heading toward the use of biocatalysis for non-chiral intermediates by resorting to renewable raw materials. To this end we are involved in several research projects.

▶ www.basf.com

Can't Judge a Product by Its Price

Saltigo's Agrochemicals Business Puts Customers' Minds at Ease

Continued Page 1

robust synthesis routes for new active ingredients that, at the same time, enjoy the highest intellectual property protection. A few fruit of this kind of labour includes novel biaryl coupling and transition-metal-catalysed cyanation of non-activated aromatic compounds while circumventing the use of sodium cyanide. We are also capable of running organometallic reactions such as

"The desire for hand-in-glove cooperation is stronger now than ever before"

Grignard or reactions with alkyl lithium compounds in a large scale up to –100 °C.

What other trends are influencing your collaborations with customers?

U. Brunk: Currently, customers are paying close attention to the total cost of ownership. The price alone does not explain everything, and now customers are looking at other costs involved, from the people taking care of their technology transfer to paying for raw materials after each step in a long synthesis chain which has a huge impact on capital employed. By considering the total cost of ownership, several companies are in the process of changing their strategy from lowest price per step to handing all steps over to one partner. This desire for hand-in-glove cooperation is stronger now than it has ever been before in the chemical industry.

Has Reach played a role in this new-found need for close collaboration?

U. Brunk: It wasn't so much the new European chemicals legislation that provided the impetus for companies to thinking of changing their strategy. It was more the development of the exchange rate, consolidation of the supplier base and the shrinking price difference between Europe and Asia. At the beginning of 2000, there was a 50% price difference; now we're looking at a mere 15%. But many customers have learned the lesson that what they get from low cost suppliers is not always perfect, which in turn minimises that 15% price advantage in the total cost of ownership. That's when companies begin to consider a strategy change.

In which agrochemical classes and areas of application is Saltigo a partner to the agrochemical industry?

U. Brunk: In my opinion we are a partner in all classes related to chemical synthesis. As far as new classes are concerned, I have to admit that because the rate of innovation has decreased in the last years, there are only few areas of activities. For customers looking into heterocycles, particularly pyrazoles – which is a trend we have noticed by patent

"What customers get from low cost suppliers is not always perfect"

analysis – we have a developed an appropriate and cost-effective synthesis in order to be the most attractive partner.

How does Saltigo follow the development of a new ingredient from beginning to end?

U. Brunk: Ideally, we begin in the development phase by proposing the most appropriate robust synthesis route. We also produce the first quantities for chronical tests for our customers, look at process optimization, piloting and scale up. We are also looking to expand our services to another segment of the product's life cycle, which we call proprietary off-patent. As I mentioned before, due to a decline in innovation, our customers have to think about what to do when their product's patent expires. When this happens, they need an attractive cost basis for the further production of their product. This is an area where we currently prepare new service offerings.

What is the relation between products that Saltigo makes exclusively for particular customers and multi-customer products?

U. Brunk: Saltigo's strategy is based on exclusive synthesis, and therefore we offer only a small number of multi-customer products in our range. To put a number on it, I would say that 90% is exclusive synthesis and the remaining 10% is multi-customer.

Do you have any overlap between the two areas?

U. Brunk: All of our custom manufacturing is covered by confidentiality disclosure agreements, so we cannot use anything for other customers. As far as the multi-customer products are concerned, we first start selling them, then we discuss downstream steps. This is the only opportunity for overlap.

What would you say are the current blockbuster chemicals in agrochemicals?

U. Brunk: There are currently very few products in the pipeline which can become a blockbuster. However, there are few new active ingredients coming up in the area of insecticides, partly because organophosphates are being banned in more and more countries.

Have you seen any effect on your business due to the current rise in demand for ethanol?

U. Brunk: From our position as an intermediates supplier we can not see an effect for the time being. We would expect an effect on our business if the land

"India will be one of the largest agrochemical countries in the future"

used for farming sugar cane, corn and oil seed rape will be increased. That would increase the need for active ingredients, which would, in return, increase the business in the area of intermediates and actives.

Do you see that happening in the next 5–10 years?

U. Brunk: My assumption is that only existing crop areas, which are now being used for food or animal feed, will be replaced. Other effects are currently more important, such as good weather conditions or attractive exchange rates in Brazil.

Due to adverse climatic conditions like uneven distribution of monsoon and low pest pressure, the agrochemical industry in India is experiencing stagnancy. Do you find it difficult to break into Asian markets?

U. Brunk: India is a very specific market because everything depends on a good monsoon season. The effects of 2005's monsoon season were felt by chemical companies, particularly the domestic ones in India. Their main products are insecticides, and because the heavy rains wiped the insects out, there was simply nothing to sell. However, that was a very particular situation, and I hope that the outlook will improve after the monsoon season 2006. I believe that India will be one of the largest agrochemical countries in the future. There are some factors that must be improved, such as increasing the harvest yield, which is currently hovering around 50% compared to what can be achieved in China. However, the current trend is leaning toward large multinational companies such as Wal-Mart and Carrefour looking to buy fruits and vegetables from India, which will change the entire pattern of active ingredients that will be used on the crops there. In the next 5–10 years, Indian farmers will need the same active ingredients as their counterparts in the Western world. This market offers a lot of potential for innovative agrochemical producers, which will have an indirect positive effect on custom manufacturers such as Saltigo.

▶ www.saltigo.com

Affichem Appoints SAFC

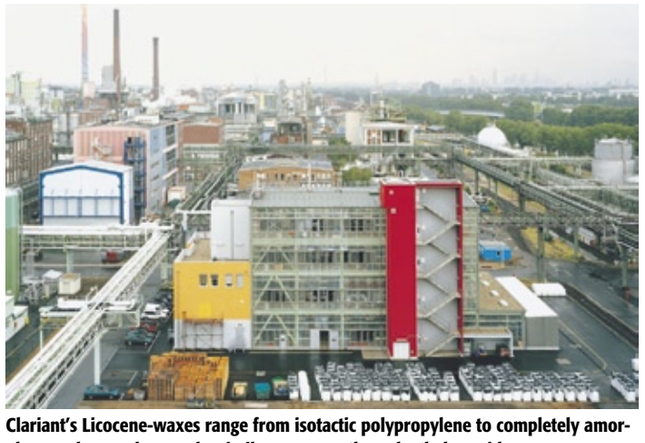
SAFC, a member of the Sigma-Aldrich Group, announced that its SAFC Pharma business segment has been appointed by Affichem, a French biotechnology company, to provide chemical development services relating to Dendrogenine A, a potential cancer treatment. Dendrogenine A, currently in pre-clinical development, is a new "first in class" molecule dedicated to the treatment of aggressive cancers. This compound contains an original mechanism of action, which makes tumor-producing, tumor-specific antigens and activates the cytotoxic T response against the tumor through the stimulation of the monocyte differentiation into "dendritic like" cells. Chemists at the SAFC Manchester facility plan to conduct process research and development on the synthesis of the material to determine a suitable process for producing sufficient quantities of Dendrogenine A for future clinical trials and cGMP commercial production.

▶ http://sigma-aldrich.com.

Clariant Inaugurates Licocene Plant

World's First Wax Production Using Metallocene Catalysis

Clariant has officially opened its new production plant for Licocene, polyolefin-based high-performance polymers in Frankfurt, Germany. After a construction period of two years, the plant, which has an annual capacity of 20,000 t, started operation on schedule. This is the first plant world wide to produce wax using metallocene catalysis, which makes it possible to individually tailor and combine such features as hardness, melting point, transparency and viscosity. While metallocene catalysis itself is not new, the Clariant-developed metallocene-catalyzed manufacture of polyolefin waxes is unique worldwide.



Clariant's Licocene-waxes range from isotactic polypropylene to completely amorphous polypropylene and a similar range on the polyethylene side.

The development of the metallocene technology started in the 1990s, based on its discovery by Professor Kaminski from the University of Hamburg, Germany. In 1993, Clariant built the first batch reactor, and a pilot plant was brought on line five years later. However, by the late 1990s, demand for metallocene soon overtook the quantities the plant was able to produce, thus prompting the company to build a large-scale plant. The Industriepark Höchst in Frankfurt, Germany, was made the location of choice in 2003.

The company has high expectations for its "designer waxes," in part because high oil prices have companies looking for cost-effective solutions. Metallocene waxes have proven useful in a number of sectors, such as dispersing agents for pigments in the manufacture of masterbatches, in adhesives and sealing compounds. They facilitate production in the plastics and automotive industries and are equally suitable for several other applications.

A large product portfolio is available ranging from tailored additives for effective and economical plastics processing to formulations for adhesives and special additives for enhanced adhesive processes. Clariant has said that the possibilities offered by this special production method are far from being fully exploited, so that more interesting developments in the Licocene family can be expected.

▶ www.clariant.com

Solvay Launches Environmentally-friendly Biocide

PRODUCT Perestane, a biocidal product created and developed by Solvay, has been proven to be an effective disinfectant against Methicillin-resistant Staphylococcus aureus (MRSA) and Clostridium difficile. These "superbugs" may cause fatal diseases, and the treatment of patients with most current antibiotics is ineffective. Researchers from the University of Leeds and Leeds General Infirmary (UK) have recently demonstrated that disinfectants commonly used in hospitals fail to eradicate Clostridium difficile from the premises, and may even promote spore formation. The effectiveness of Perestane against MRSA and Clostridium difficile was confirmed by the Hospital Infection Research Laboratory (City Hospital Birmingham, UK) and a recent report from an independent British laboratory accredited by UKAS, the United Kingdom Accreditation Service.

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DSM Pharmaceuticals Expands

SERVICE DSM Pharmaceuticals completed an expansion to its sterile parenteral manufacturing facility in Greenville, NC, adding a Clinical Trial Material manufacturing suite capable of manufacturing large and small molecule liquid and lyophilized products for PI-III clinical trials. "What's resulted is an expanded service offering consistent with the level of high quality service and deliverables our customers have come to expect from DSM," said Terry Novak, Chief Marketing Officer, DSM Pharmaceuticals Inc. "For customers with sterile products in development, they can now start with DSM in clinical trial manufacturing and stay with DSM through commercial manufacturing." This service combined with optional support services such as, QA Audits, Regulatory Support, Lyophilization Cycle development; Analytical methods development and testing provide DSM customers with comprehensive services, consistency and support unparalleled in the industry.

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Portfolio for Chemical and Life-Science Industries

PRODUCT Through Triple Synthesis Power, Wacker offers key life-science sectors a broad basis for the synthesis of complex building blocks, such as pharmaceutical intermediates. The package's platforms support the synthesis, for example, of silane synthons, chiral alcohols and purely vegetable-based cysteine for use in agrochemicals, pharmaceuticals and food processing. At this year's InformexUSA in San Francisco, Calif., Wacker Fine Chemicals will highlight the potential of combining its three technology platforms. Wacker's organic-synthesis platform includes the special area of selective chlorination. The company's many chlorination methods provide pathways to a series of alpha-chlorocarbonyl compounds, which can be produced on an industrial scale. Organic-synthesis activities are based on ketene/diketene chemistry, leading to a large number of keto compounds, such as

acetylacetone. This compound is used to produce several basic building blocks for the synthesis of agrochemical and pharmaceutical actives. It is also a starting material for polymerization catalysts and PVC stabilizers.

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Reaching The Finish Line

For Better or Worse, the EU Chemicals Legislation Has Been Finalised

After over three years of heated debate, European Parliament President Josep Borrell and Finnish Prime Minister Matti Vanhanen officially signed the new chemicals legislation in December. With the signing Reach will be officially published and become law on 1 June, replacing 40 existing legislative texts.

Once in force, Reach will require the registration of some 30,000 chemical substances over the next 11 years, a process which is planned to fill information gaps on the hazards of substances and to identify appropriate risk management measures to ensure their safe use. The burden of proof has been shifted to the chemical industry, which is now called upon to generate the required data and to identify risk-management measures.

The European Commission has estimated that the new law will cost the chemical industry between €2.8 and €5.2 billion over the next decade. The EC also reports that the law would save Europe €54 billion over 30 years as a result of less people becoming ill from exposure to dangerous chemicals. The reaction to the passing of the legislation was mixed:

Hendrik Abma
FECC

Joel Decaillon
European Trade Union Confederation

John Holbrow
UK Federation of Small Businesses

Jack Gerard, American Chemical Council president and CEO

A Welcome Compromise
– Hendrik Abma, FECC –

FECC, the European Association of Chemical Distributors, has welcomed the fact that the European Institutions have agreed upon a compromise on the Reach Regulation. Entering into a lengthy conciliation process would have created further difficulties for industry and uncertainties both in terms of the requirements for implementation and timing.

FECC welcomes that the final text includes some improvements that had been advocated by FECC, such as the central role of the Chemicals Agency, the OSOR principle, the requirement of a Chemical Safety Report above 10 t, and an improved data protection. However, FECC still believes that some aspects of Reach in its current form will make implementation very challenging, in particular for SMEs. FECC specially regrets that the Institutions have failed to introduce a satisfactory solution for the issue of imported preparations, and consequently alleviate the burdensome and costly registration of all substances within an imported preparation.

FECC calls for the on-going Reach Implementation Projects (RIPs) to take into account the chemical distribution industry's concerns in order to produce workable guidelines, which can be easily accessed and comprehend by companies, particularly SMEs.

Clear Progress
– Joel Decaillon, ETUC –

Reach marks clear progress, because industry will now have to provide information on the safety of their chemicals before they can put them on the market. But European trade unions take issue with the fact that information vital to protecting workers' health given in the chemical safety reports will now only be required for a third of the chemicals originally planned. If the chemical industry thinks it will win the drive for competitiveness at the cost of public, occupational and environmental health, it has another think coming. It will only win out by being more open about the safety of its products and bringing innovative products to market that are safer for human and environmental health.

▶ www.etuc.org

Sensitive Implementation Necessary
– John Holbrow, FSB –

FECC Members are aware of their duties within the Reach Regulation and are keen to commence focusing on the implementation of Reach in order to complete the inherent tasks and obligations, to the best of their abilities, and to facilitate the information flow and dialogue between suppliers and downstream users.

▶ www.fecc.org

Reach will require sensitive and smart implementation to ensure that it does not cripple small businesses. This legislation will affect tens of thousands of small businesses. Civil servants must bear in mind the thousands of jobs across the business spectrum that depend on Reach being implemented well. Effective, easy to access and well-publicised guidance from the government will also be essential to help small firms meet their obligations. With the right advice, small firms can do their bit without being left exposed to prosecution due to their understandable lack of resources and specialised knowledge.

▶ www.fsb.org.uk

An Ambitious Experiment
– Jack Gerard, ACC –

The European Commission recently approved a new chemical regulatory policy, known as Reach. Under the new legislation, all chemicals manufactured or imported at more than one t/y must be registered and, in some cases, used only if specifically authorised. Hundreds of chemicals now safely used will be removed from the market by forced substitution. The American Chemistry Council (ACC), the non-profit trade association whose member companies represent more than 90% of the productive capacity for industrial chemicals in the U.S., believes that Reach is an ambitious experiment for which compliance will be an enormous challenge.

There is no experience to date with administering a system of this breadth and ambition. Experience with Europe's previous system suggests that registration of 30,000 chemicals in the given timeframe will prove difficult. The regulation also extends to products made from chemistry – everything from airplanes, cars, and clothing to adhesive tape – further complicating matters for global trade.

ACC is concerned that Reach does not align with how the chemical industry operates in today's competitive economy, and takes a "one-size-fits-all" approach, which does not afford sufficient flexibility to account for the unique applications and scientific understanding. In 2003, the European Commission acknowledged that the direct cost to industry to simply register their current products would range from €2.8–5.3 billion. ACC believes that – at least in the short term – investment in new products and technologies will decrease as company resources become focused on completing the initial registration requirements. This will not benefit Europe, or the economies which have previously looked to Europe for trade and development.

▶ www.americanchemistry.com

REACH TIMELINE

2007

June 2007

Entry into force of Reach

2008

June 2008

European Chemicals Agency becomes operational

2010

June – November 2008

Pre-registration of phase-in substances.

November 2010

Registration deadline for substances in quantities of 1,000 t and above as well as carcinogens, mutagens and substances toxic to reproduction (CMR category 1 and 2) above 1 t/y and substances classified as very toxic to aquatic organisms (R50/53) above 100 t.

2013

June 2013

Registration deadline for substances in quantities of 100 t and more and substances toxic for the aquatic environment.

2018

June 2018

Registration deadline for substances in quantities of 1 t and more.

Source: European Union

Committed to Making Reach Work

Cefic's Director General Comments on the New Legislation

COMMENTARY With the final vote on Reach in the European Parliament and the formal adoption by the EU Council in December, a six-year legislative process has come to a close; Reach will now enter into force on 1 June.

For the chemical industry and for the downstream industrial sectors, the discussions round this new chemicals policy have been the biggest regulatory challenge ever. When the white paper on a chemicals policy review was introduced by EU Commissioner Margot Wallström back in February 2001, the European chemical industry welcomed this new regulatory initiative, since it was meant to replace a series of ineffective existing laws. The chemical industry fully adhered to the overall political goals of this White Paper. Indeed, its objectives were in line with the principles of sustainable development (SD) implying an equal balance between the three SD pillars: economy, environment and social well-being.

The aim of Reach was very clear: verify that the appropriate knowledge on chemicals and their risks is available; check that risks are properly managed

Alain Perroy, Cefic

and if not take action to correct this. However, the past few years have proved very challenging in trying to keep Reach risk-based and workable.

Industry contributions to the work have paid off: A lot of points have been clarified or simplified to make Reach work in practice and deliver solid results for health and environmental improvements, which is what we all want. To illustrate this it is worth mentioning that:

- registration has been refocused to avoid duplication with other legislation
- the scope of registration has been revisited to avoid inclusion of or simplify requirements for substances that pose no or little risk
- risk based prioritisation has been introduced to address first substances of higher concern and/or with greatest improvement potential
- requirements have been tailored to potential risks with the possibility of waiving tests
- the protection of confidential business information has been increased
- the duty of care concept, which is very much in line with our responsible care philosophy, is referred to in the recitals of the law, thus showing the overall intention, but not in the legal text itself as this would have introduced unnecessary and delicate liability implications.

Furthermore, a strong European Chemical Agency will be established which should ensure consistent decisions across Europe and maintain the integrity of the internal market.

When looking closer at the end-phase of the legislative process, it is interesting to note that the text voted on by the EU Parliament on in December was the one that had been agreed a week earlier, during the last hours of the trialogue between the Parliament, Council and Commission.

This suggests that the excellent work done during six years of preparation, first with the Commission and its consultation procedure to elaborate a legislative proposal, then with the European Parliament and its good compromise on the registration package voted in first reading, and finally with the Council who did a remarkable job in finding the right balance between the Commission text and the Parliament amendments, was called into question and arbitrated in a few hours of what was closer to pure bargaining than to intelligent co-decision mechanism to develop high quality legislation. This is clearly a serious concern about the functioning of the EU Institutions for establishing major pieces of legislation that will affect the entire EU economy as well as all citizens. And such malfunction cannot be ignored if we want to restore the confidence of EU citizens in Europe.

The "compromise" elaborated at the last minute does raise concern, particularly over authorisation/ substitution of chemicals. Indeed, departing from a risk-based approach, the trialogue compromise agreement on authorisation now requires the submission of a substitution plan for all the substances where a suitable alternative exists, even if they are adequately controlled. Deviating from the fundamental objective of Reach of ensuring proper control of risks connected to chemicals, these new requirements reflected a totally different strategy aimed at phasing out substances on the sole basis of their hazards.

This would generate an additional burden for chemical producers and downstream users alike. It would also affect the supply of raw materials for different sectors of EU industry; and this without any clear benefit for the end consumer. Industry, suppliers and downstream users have a long tradition of innovating, developing and using safer and better alternatives when possible. This however, requires time and entails active involvement of the whole supply chain as well as a case-by-case judgement.

Fortunately, authorisation decisions will remain based on risk when "adequate" control can be demonstrated, which is the essence of our risk management practice. Last but not least, substitution plans required for high concern substances refer to economically and technically viable solutions for the company applying for authorisation.

With the legislative process now completed, the European chemical industry is definitely looking forward, not backward. Of course, Reach remains an extremely demanding regulation and it could have been simpler for some aspects but it is the opinion of Cefic that, after having called for workability during the legislative process, we now need to be fully committed to making Reach work in practice.

Indeed, Reach must be seen as an opportunity for our industry to demonstrate that it has a sound knowledge of its products and excellent practice for safe manufacturing and use of chemicals. Cefic will play an active role in helping companies to comply with the regulation. Cefic and its members remain fully committed to contributing and to providing expertise to the authorities during the implementation process to keep the right focus on workability.

We acknowledge the efforts made by all actors involved in seeking an agreement ending a long period of uncertainty for industry and business at large and we call on the institutions concerned to continue developing the technical guidance and instruments needed to secure the successful implementation of the legislation.

After years of receiving criticism about chemicals, we must now show that we are the ones who will make it possible for Reach to deliver real improvements for health and the environment. This is the right attitude for an industry which is proud of its previous achievements in health and environmental protection and will continue to operate within the framework of its responsible care commitment.

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Reach: Frequently Asked Questions

Q: How much will Reach cost?
A: Testing and registration costs for producers and importers of chemicals: The Commission's Impact Assessment in 2003 estimated the direct costs of Reach to the chemicals industry at a total of some €2.3 billion over an 11 year period. The changes in the proposal since then have further reduced the administrative and cost burden for companies, in particular for the substances supplied in lower volumes and for small and medium-sized enterprises (SMEs). However, the cost of the Agency increased significantly because the Council and Parliament have added substantial new responsibilities, in particular that of ensuring a harmonised approach to the evaluation of registration dossiers. However, these additional Agency costs should be seen in the context of from tasks being shifted from the competent authorities of the Member States to the Agency.
Costs to downstream users: The costs to downstream users of chemicals were estimated in the Commission's Impact Assessment of 2003 at €0.5 – 1.3 billion, under the assumption that 1 – 2 % of the substances would be withdrawn because continued production would no longer be profitable. Costs could rise to €1.7 – 2.9 billion when industry would face higher substitution costs in the downstream supply chains.

Q: What are the industry obligations?
Manufacturers and importers are obliged to register substances they produce or import in quantities over 1 t/y. The registration requirement applies to substances on their own, in preparations and in articles under special conditions (intentional release). Failure to register means that the substance cannot be manufactured, imported or used in the EU market.
Downstream users of chemicals must apply the risk management measures for dangerous substances identified on the supplier Safety Data Sheets. They have a right to make their use of a substance known to the manufacturer in order to make it an identified use and have it covered in their supplier's chemical safety assessment. In this case they have to provide sufficient information to allow the supplier to prepare an exposure scenario for the use. Alternatively they can conduct their own chemical safety assessment and report this use to the chemicals agency.

Q: What types of obligations will they have?
A: The first Reach obligation, pre-registration, will take place from 1 June – 30 November 2008. Following pre-registration, registration deadlines apply in November 2010, June 2013 and June 2018, depending on the volume band or level of concern of the substance. Registration obligations apply to manufacturers and importers of chemicals who need to gather comprehensive information on the properties of the substance they produced or imported over one tonne per year. This information and evidence demonstrating the safe use of the substance need to be submitted in a registration dossier to the European Chemicals Agency. Users of chemicals are advised to communicate proactively with their suppliers to ensure that their uses are covered by registration dossiers of their suppliers.
New substances need to be registered before they are placed on the market. Their registration will start on 1 June 2008.
If a substance has been identified for authorisation, companies may only manufacture, import or use the substance after the sunset date, if they have obtained an authorisation for a particular use. Companies can apply for an authorisation until 18 months before the sunset date, providing all relevant documentation, including an analysis of substitutes and where safer alternative substances are available, substitution plans, and an indication of relevant R&D plans, if appropriate.
Companies using substances subject to restrictions must respect the conditions of the restrictions.

Q: How will authorisation work in practice?
A: Around 1,500 substances of very high concern may become subject to authorisation, including:
- CMRs (substances that are carcinogenic, mutagenic or toxic to reproduction), category 1 and 2,
- PBTs (substances with persistent, bio-accumulative and toxic properties),
- vPvBs (substances that are very persistent, very bio-accumulative).
- Substances identified from scientific evidence as causing probable serious effects to human health and the environment equivalent to those of the other categories mentioned above. These will be identified on a case by case basis. The authorisation system is intended to ensure that such substances will be progressively replaced wherever they cause unacceptable risks for human health and the environment or where there are no other reasons that justify carrying on using them.

In particular, there may be applications where exposure to human beings or the environment is very limited and where risks can be adequately controlled. In other cases, the use of such substances can create substantial socio-economic benefits that outweigh the risks associated with the use (e.g. ensuring safety of equipment for cases where there is no suitable alternative). For these uses, special rules for authorisation have been defined.
The share of dangerous substances among the new substances manufactured or marketed since 1981 is about 70 %. This includes substances of very high concern and those of lesser concern but which are still dangerous. This means that 70 % of new substances have at least one dangerous property.
New substances need to be registered before they are placed on the market. Their registration will start on 1 June 2008.

Q: What will the European Chemicals Agency do?
A: The Agency will manage and in some cases carry out the technical, scientific and administrative aspects of Reach and ensure consistency at Community level in relation to these aspects. The Agency shall provide the Member States and the Institutions of the Community with the best possible scientific and technical advice on questions relating to chemicals covered by the Regulation. The new European Chemicals Agency will be established in Helsinki, Finland, in 2007. It will be headed by an Executive Director and it will have a secretariat which is planned to grow in a year from around 80 to 220, and then gradually to the planned full staff of about 450.

Q: When will the guidance and tools be available?
A: The IT tool for submitting registrations will be IUCLID5, which will be rolled out to the industry this spring.
New guidance documents and IT tools are currently being developed under Reach Implementation Projects to make the transition to the new system as easy as possible. These instruments comprise easily understandable guidance for SMEs, more detailed information for specialists in chemical companies and IT tools for on-line registrations to the future European Chemicals Agency (ECHA).
The guidance and IT tools to support registrants and users of chemicals will be made available free of charge through the Agency website that will be launched in mid-2007. The website will consist of an IT based guidance navigator-tool and detailed guidance documents. The navigator will help the users to find out their obligations and direct them to relevant parts of the guidance, tools and formats available on the website.

▶ www.europa.eu

Source: European Union

More Than Meets the Eye

Bioplastics Can Be Used in Myriad Applications

Bioplastics encompass a heterogeneous group of plastics and more importantly the term combines two different concepts: material sourcing – the use of biomass as a renewable resource; and material functionality – biodegradability as additional product performance. In order to maintain a rational debate these concepts must not be confused; there are biomass-based plastics which are not biodegradable, and there are biodegradable plastics which are fossil fuel based.

Bioplastics are part of the plastics family and encompass cellulose derivatives, starch containing plastic blends and specific groups of polyesters, mainly aliphatic. Their demand in Europe (EU-25) is small: about 0.05 mt/y in 2005, compared to the overall plastics demand of 48.5 mt/y.

Aspects Of Biodegradation

Biodegradable plastics degrade completely into carbon dioxide, water, methane and biomass at the end of their useful life. However, the term biodegradability needs a clear definition, because the degradation mechanism and degradation speed are dependent on the biological environment in which the biodegradation is due to take place.

In packaging applications, biodegradability usually means compostability. Biodegradable plastics are being used more often as bags and boxes for fresh produce in supermarkets or as bags for compostable green waste. The rational is to save the cost of handling the separation of content from container when the produce reaches its sell-by date or when waste bags enter a composting plant. A legally binding European standard, EN 13432, regulates the procedures and requirements under which packaging can claim to be compostable. Packaging labelled as compostable is designed to degrade under industrial conditions, which operate at about 60 °C. In home composting (or as litter in the environment), the average temperature is usually lower and therefore some packaging may not degrade as anticipated.

Another interesting application of biodegradable plastics is mulch films. These are used by farmers to cover crop fields to prevent the growth of weeds and to reduce the evaporation of soil-bound water. After the harvesting period, biodegradable films can be ploughed in when the field is prepared for the new growing season. Standardisation for mulch films is still being developed on the national level. In this case, the definition of biodegradability has to regard the circumstances that exist in soil.

In summary, biodegradable plastics can theoretically be tailor made to the biological environment in which the degradation is supposed to take place.

Biomass as a Renewable Resource for Plastics

There are several drivers for an increased use of biomass in plastics production. The concept of growing crops that result in plastics materials that can be returned to nature after their use is attractive to the agricultural community. Other drivers in this subject are issues related to the use of oil. Oil is a commodity with limited availability, and its price is affected by political and environmental risks. Even though oil and other fossil resources will be around for a while, some stakeholders view biomass based plastics as the salvation to fossil fuel conservation and the reduction of greenhouse gas emissions.

The Plastics Road Map

The source for making plastics can be almost anything that contains carbon and hydrogen as the main chemical elements. Such resources are coal, lignite, natural gas, oil, used plastics, biomass and even carbon dioxide. Price, consistency in availability and quality will determine the preferred raw material source. Currently, conventional plastics based on fossil fuels represent more than 99 % of the total. Both renewable and fossil resources should be considered when developing plastics. Eventually, the most eco-efficient route for making a plastic material will be chosen.

Synergies are possible between biomass-based and fossil resources. Both should be considered when developing polymers.

Approaches to Biomass-based Plastics

The plastics industry already uses biomass-based materials where they are economically and technically viable. However, there is also still a lot of research needed to develop the necessary technologies to make full use of all available biomass.

To use biomass as a resource for plastics one has – in principle – two options to approach the market: The first option is the biological synthesis of new monomers for the production of new plastics or the biological synthesis of the polymeric material itself (e.g. polylacticacid or PLA). These plastics will have different property profiles compared to conventional plastics. Even though the applications already exist, the market introduction is slow as the product properties differ from the materials in use and the performance of the new material has to be tested through out the whole application chain. The growth rate for such materials is largely determined by market development needs and the speed with which one can overcome the obstacles.

The second option is the biological synthesis of known monomers from biomass like ethanol, complementing fossil resources, to produce existing plastics, e.g. Polyethylene. Well-established markets exist and market penetration is mainly cost driven.

Are There Limits?

Land is sufficiently available for the currently small volume (0.05 mt/y) of biomass-based plastics. The University of Utrecht and the Fraunhofer Gesellschaft estimated in 2004 that 15.4 mt/y of existing plastics – or one third – had the potential to be replaced by biomass-based materials. This would require about 5 Mha of arable land or 4 – 5 % of the total.

In addition to the possible use as plastics, raw material biomass is also used as an energy source e.g. as biofuel. The EU plans to substitute 20 % (about 75 mt) of transport fuel with bio-fuels by 2020. This would require 9 – 60 Mha arable land, when calculated on the basis of energy plants or rapeseed oil or bio-ethanol from grain.

Regulatory efforts (i.e. quotas) create a high demand in the bio-fuel area, which could limit the availability of resources for the production of plastics. Setting quotas for the use of biomass as feedstock for plastics should be avoided, as the only effect would be artificial price hikes with no positive influence on either resource efficiency or emissions savings. It is worthwhile noting here that the EU was not able to meet the target quota for bio-fuels in 2005 (1.5 % instead of 2 %).

Energy Savings, Green House Gas Emissions

In general, plastics help to use resources in a most efficient way. Plastic foam products for instance, enable huge energy and green house gas savings due to their effective insulation performance. The combination of light weight and small wall thicknesses makes them a preferred material in the construction sector and refrigeration systems.

The vast majority of oil and gas (87 %) is used as energy. Oil and other fossil fuels are used everyday to produce energy. Diverting oil into plastics extends the life time of this oil fraction through long-lasting applications. This can even be extended by material and feedstock recycling. The residual plastic refuse can, due to its high calorific value, be returned into the energy making path as solid fuel reducing the amount of fossil fuel needed.

Biomass-based plastics consume two major resources that are free: sunlight and carbon dioxide from the atmosphere. Through assimilation we obtain e.g. agricultural feed stock. From harvesting to composting the employed operations require additional conventional energy input. Many biomass based plastics offer compostability as an additional feature. However, after material recycling, energy recovery should be the preferred recovery option to make best use of the stored energy from sunlight.

The general consensus is that the energy and GHG savings related to the use of biomass-based plastics are limited to their vegetable matter.

Environmentally Friendly

Plastics in general are environmentally friendly. The strength of plastics lies in their variety, which allows them to be tailored to the application. By that they contribute to efficient use of energy, less emissions and an innovative future. Using biomass as a renewable resource is an enlargement of the raw material supply base. Decisions in favour of biomass-based and biodegradable plastics must be based on sound scientific criteria and a life cycle approach. It must not lead to discrimination against traditional plastics on perceived environmental benefits.

The fact that plastics are based on biomass or are biodegradable does not automatically make them environmentally friendly and preferable to plastics based on fossil fuels. The demand of the market place should control the growth of biomass based and biodegradable plastics. Political action should concentrate on the supply side and ensure a reliable supply of biomass-based resources for food, fossil fuel substitution and other industrial applications such as chemicals and plastics.

Snapshot Europe 2005

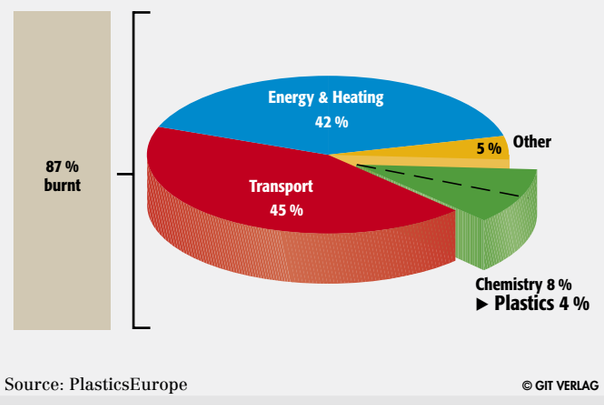
- Total plastics demand: 48.5 million t
- Bioplastics demand: 0.05 million t (30 % growth/year)
- Current production of energy from biomass: 69 million t
- Total oil and gas consumption: 1,115 million t

Applications for cellulose derivatives

- Shampoo
- Pre-prepared food
- Toothpaste
- Pharmaceutical formulations
- Plastering
- Tile adhesive
- Paints

Source: Bayer Material Science

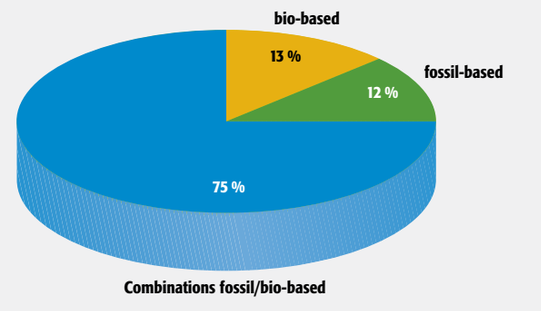
Consumption of Oil by Sector Figure 1



Source: PlasticsEurope © GIT VERLAG

Plastics in use save 50 % of their oil equivalent as energy.

Biodegradable Plastics and Raw Materials Figure 2



Source: Frost & Sullivan © GIT VERLAG

Plastics that are 100 % bio-based are not always biodegradable (e.g. polypeptide). On the other hand, 100 % fossil-based polymers can be totally biodegradable (e.g. copolyester of 1,2 ethanediol, adipic acid). Enzymes do not discriminate against the origin of the polymer, rather only on the basis of its chemical structure.

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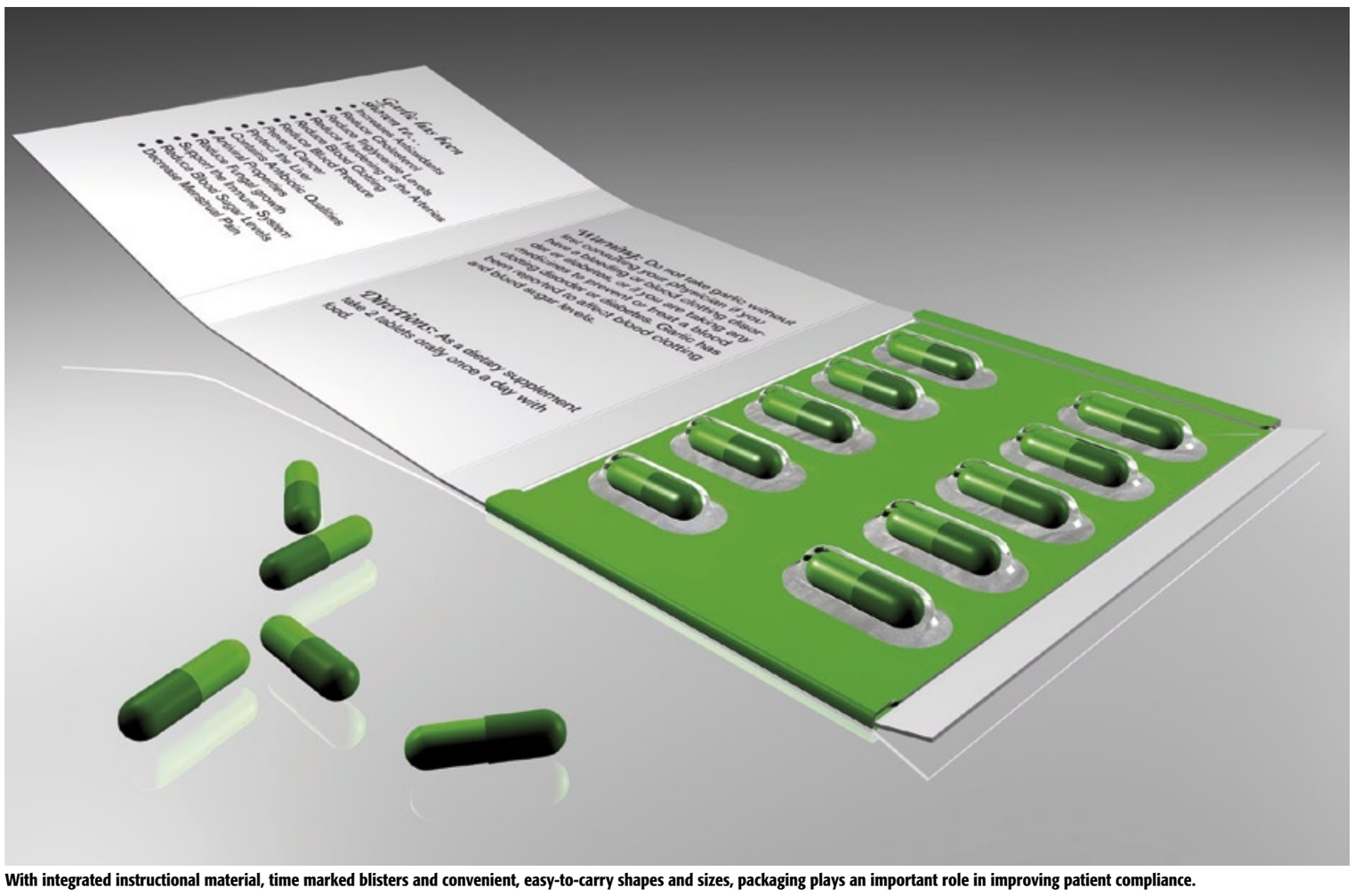
Patient Compliance

Wallet Packaging Strikes a Balance

Today, more patients are managing their own healthcare through an array of prescribed and over-the-counter (OTC) medications than at any other time in history. Patient compliance is critical to successful treatment under these circumstances, and the medical community has been working toward improving rates of medicines taken at the right time, dosage and combination. Improving patient compliance, only slightly, can have dramatic impact on improving patient health, reducing resistant strains of bacteria and saving healthcare systems money.



With integrated instructional material, time marked blisters and convenient, easy-to-carry shapes and sizes, packaging plays an important role in improving patient compliance.

According to a 2004 Datamonitor report, the EU alone registers €30 billion in yearly revenue loss, caused by patient non-compliance with their medication. In 2004, prescribed medicines cost the UK's National Health System more than £8 billion in England alone, yet four out of 10 people did not take them regularly enough to derive any benefit. The U.S. National Pharmaceutical Council announced that medication non-compliance costs the U.S. 125,000 deaths and US-$100 billion yearly. It is responsible for 10% of U.S. hospital admissions, which means 380,000 patients and US-$31 billion yearly.

Packaging Important For Compliance

With integrated instructional material, time marked blisters and convenient, easy-to-carry shapes and sizes, packaging plays an important role in improving patient compliance. Pharmaceutical wallets can combine these aspects into one package, ideal for improving patient compliance. Wallets are not new to the market, but companies have worked to create wallets that are cost-effective to produce yet have the features that offer patients convenience, information and peace of mind. The results allow pharmaceutical companies to improve patient health, save money, streamline manufacturing and differentiate their brands in a highly competitive market.

Patient Health First

First and foremost, wallet packaging benefits patients by offering a simple, easy-to-use and convenient way to maximise the effectiveness of their treatment. For serious illnesses such as osteoporosis and diabetes as well as with antibiotic treatments, scheduled doses must be strictly followed. Osteoporosis patients, for example, must take medication at the same day each week at a set time in the morning. Wallets can easily indicate such information so the patient essentially has a detailed calendar and schedule as well as record of treatment easily at their disposal. In addition, while printed information inserted into a bottle or secondary package is easily discarded, a wallet can have the information integrated into the device used by patients on a daily basis. This type of integrated information ensures that patients have access to facts about their condition and medication consistently and reliably. This is essential for patients to not only reap the full benefits of a drug, but also to ensure that patients fully understand the consequences of not taking the drug correctly.

Streamlining Production

For any packaging solution to be successful it must first solve a problem, and then solve it cost effectively. Wallet-style packaging offers an array of benefits to pharmaceutical producers and patients, but the production requirements must be easy to implement for the packaging to be widely adopted.

For example, Bosch Pharma Solid (part of Bosch Packaging Technology) evaluated the marketplace and saw that while wallets answered many needs, they could be more widely adopted if manufacturing the wallet could be streamlined. The result was the SmartWallet, which has an investment similar to conventional folding boxes, opening wallet packaging to a wider range of applications.

SmartWallet is both the package and the package making process. It starts as a pre-glued outer sleeve erected and loaded with a blister on a conventional cartoning machine called the CUT130SW. A blister package, along with a paperboard card, is glued into the outer sleeve through lateral holding flaps. Leaflets or booklets can be pre-configured in the outer sleeve, introduced into the wallet during packing, or integrated into the outer packaging.

The CUT130SW cartoning machine produces both wallets and conventional folding boxes – ideal for a dual strategy of production allowing better utilisation of a packaging line, particularly if only a smaller part of the production volume is in a wallet. Because leaflets and booklets can either be prefigured or inserted during manufacturing, loaded into the wallet with the blister, attached to the outside of the wallet or be part of the outer packaging, the wallet as a package style becomes feasible for many more drugs than before.

This system overcomes many of the challenges that have faced blister pack wallets and opens the solution to a wider range of products. By using a standard cartoner as the base machine, the system offers more packaging flexibility to pharmaceutical packagers and equipment can easily be repurposed to run cartons or wallets thereby increasing its value to the user.

Shelf Appeal

Studies show that patients comply more readily when presented with convenient solutions that integrate more readily into their every day lives. Patients perceive medication not only by how effectively it treats illness or symptoms, but by how it will become part of their lives. This is particularly true for OTC products, another growing market for packaging such as SmartWallet.

Wallets are a significant way of differentiating a product to patients who purchase according to visual appeal and convenience. By offering a product that is easier to carry, use, and understand, pharmaceutical companies can effectively create impact with new products, and differentiate older products against the competition.

Tamper indication and reclosability are other important factors in OTC pharmaceutical packaging, and the new generation wallet packaging offers its own unique approach. Both are standard features of SmartWallet, with the tamper evidence achieved by a few firm glue points on the opening flap, and the recloseability achieved by a strip of special glue on the same flap. Other solutions, such as tuck-in mechanisms or self-adhesive strips, can be implemented as well.

Currently, the pharmaceutical industry is facing major changes, as the rate of drug discovery is expected to decrease significantly in the near future. Companies that once competed with new products will compete on convenience, information and branding even more so than today. Packaging solutions such as the SmartWallet that offer an effective and efficient edge in these arenas are already helping companies introduce packaging that has both shelf impact and production efficiency.

Conclusion

Full-patient compliance should be the goal medical and pharmaceutical communities strive for, but the fact is that reducing patient non-compliance even a small amount could dramatically improve health and significantly reduce costs.

Moreover, by introducing packaging such as SmartWallet, pharmaceutical companies have the opportunity to create greater efficiencies in their packaging operation, and differentiate their product against stiff competition. This type of package design and process innovation takes into consideration the needs of both the doctor and patients as well as the needs of the pharmaceutical manufacturers. The result is a package that maximises compliance while, at the same time, streamlines production and differentiates products – an essential balance in remaining competitive in pharmaceuticals today and tomorrow.

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Wallets can easily indicate information so the patient has a detailed calendar and schedule as well as record of treatment easily at their disposal.

Pierre Fabre Acquires UCB's OTC Business

Pierre Fabre and UCB jointly announce that Pierre Fabre, a pharmaceutical company in the European Over-The-Counter (OTC) market, has acquired the OTC business of UCB in France, Benelux, Switzerland and Greece. The acquisition involves certain mature products with strong brand names (Carbolevure, Revitalose, Balsoclase, Toclase), representing sales of approximately €18 million. The transaction includes the sale of UCB OTC assets in France, Benelux, Switzerland and Greece. UCB will continue to manufacture and supply some of the transferred products during a transitional period. Furthermore, UCB and Pierre Fabre have entered into a distribution agreement under which Pierre Fabre will pursue the active marketing of UCB's anti-histamine, ZyrtecSet, in the OTC market in France.

▶ www.pierre-fabre.com
▶ www.ucb-group.com

GlaxoSmithKline to Acquire Praecis Pharmaceuticals

GlaxoSmithKline (GSK) and Praecis Pharmaceuticals announced execution of a definitive agreement providing for GSK to acquire all outstanding shares of Praecis' common stock for a cash purchase price of US-$5.00 per share or a total of approximately US-$54.8 million for the entire equity interest of Praecis.

"Praecis has created novel therapeutic programs and innovative chemical-synthesis and screening technology that will complement our own discovery capabilities," said Allen Oliff, senior vice president, Molecular Discovery Research, GSK. The acquisition will be effected by means of a cash tender offer by a wholly owned subsidiary of GSK for all of the outstanding shares of Praecis, at a cash purchase price of US-$5.00 per share, followed by a second-step merger in which any untendered Praecis shares would be acquired at the same price per share. The acquisition is subject to certain conditions, including the tender of a majority of the shares of Praecis common stock, and other customary conditions. The transaction has been approved by GSK and by the board of directors of Praecis. GSK and Praecis expect the tender offer to be commenced in early January and to close in the first quarter.

▶ www.gsk.com
▶ www.praecis.com

Solvay, Wyeth Collaborate

Solvay Pharmaceuticals and Wyeth Pharmaceuticals are expanding their existing neuroscience co-development, and co-commercialisation agreement to include research in neuroscience. The neuroscience co-development and co-commercialisation partnership already announced in April 2004 between Solvay and Wyeth has resulted in a New Drug Application for bifeprunox for the treatment of patients with schizophrenia, submitted in October 2006 to the U.S. Food and Drug Administration and filed by them in December. Meanwhile development continues on two other early phase neuroscience projects SLV313 and SLV314, which were part of that agreement. Under the new agreement, the parties will collaborate in a joint discovery effort targeting the identification of small molecules with the potential to be used as anti-psychotic medications. Any compounds discovered under this research collaboration will be co-owned and co-patented by Solvay and Wyeth and could be selected for co-development and co-commercialization by Solvay and Wyeth.

▶ www.solvay.com
▶ www.wyeth.com

Astellas Transfers Three European Plants

Astellas Pharma announced that Temmler Group and Astellas have reached an agreement and concluded a contract providing for the transfer by Astellas of bulk assets comprising the Munich Plant and Klinge Ireland Plant of Astellas Deutschland, and all stocks of Produzioni Farmaceutiche Carugate S.r.l, to Temmler Group. Astellas has previously declared in its mid-term 5-year management plan, ending in FY2010 (fiscal year ending March 2011), that the number of production sites will be reduced from the current 18 (9 in Japan and 9 overseas) to around 10 by FY2010 to achieve an optimal production system. This transfer of three plants has been effected in order to carry out this mid-term 5-year management plan.

▶ www.astellas.com

Lonza, BioOne Capital Invest in Manufacturing Facility

Lonza Group and Singapore's BioOne Capital have signed a joint venture, Lonza Biologics Tuas, to build a large-scale mammalian cell culture facility in Singapore for the manufacture of commercial biopharmaceuticals. This will be the second large-scale mammalian manufacturing plant in Singapore, and the third one globally that Lonza has built. Depending upon customer request, the capital investment will amount up to US-$350 million. Lonza Biologics Tuas, located in Tuas Biomedical Park, will have up to four mammalian bioreactor trains, each with a flexible capacity of 1,000 up to 20,000 liters and inclusive of the respective purification units. The plant is expected to be constructed over two phases. The construction of the Lonza Biologics Tuas shell, in the first phase, will be initiated in February and the groundbreaking ceremony will be celebrated in March. The final build-out of the facility will be completed and become operational at the latest in 2011, in line with customer commitments.

▶ www.lonza.com
▶ www.bio1capital.com

Biotech Company Moves to IZB

Origenis, a privately owned biotech-company, has moved its head quarter to the IZB in Martinsried near Munich, Germany. The main factor for moving in the Innovation Centre for Biotechnology (IZB) in Planegg-Martinsried was the offer of optimal building infrastructure (S1 and S2 labs) especially designed for the needs of young biotech start-ups for fair rents as well as the great neighbourhood with a high potential in life sciences. The company provides creative services for drug design, synthesis, and characterisation based on its unique, patented technology platform – MOREsystem.

The company employs proprietary multiparametric design approaches for the directed target and indication optimised exploitation of billions of novel compounds. The unique process allows immediate realisation of designed molecules by parallel non-combinatorial synthesis, their automated MedChem optimization and biological characterisation of the products.

▶ www.origenis.de
▶ www.izb-online.de

Data Logger in Storage and Packaging Centre

CASE STUDY The U.S. Food and Drug Administration (FDA) and the European Good Automated Manufacturing Practice (GAMP) directives require regular data acquisition and documentation of the prevailing conditions in rooms used for the production and storage of pharmaceutical products. The company F. Hoffmann-La Roche in Kaiseraugst, Germany, has one of Europe's modern storage and packaging centres for pharmaceutical specialities.

The high-rise centre contains various materials, such as packaging or ready-packed medicines. The more than 13,000 palette positions are managed and controlled fully automatically by a storage management system. After an evaluation phase with various data-logger systems, the company decided on the HygroLog NT from Rotronic. This temperature and humidity data logger meets the high requirements of the FDA (CFR21, Part 11) and GAMP4 directives in full and has a number of advantages. For instance, the HygroLog NT, with its digital concept, measures precisely and the HygroClip probe displays unusually high performance, with long-term stability. The 160-measurement points are read out continually via a network by an OPC server and are made available by Roche's evaluation software. Server-client functions allow online visualisation of the current measurement values. In addition, the data are stored directly on a flash card in the HygroLog NT as a backup.

▶ Rotronic AG
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Optimised Distribution of Biopharmaceutical Water

PRODUCT In pure water systems, the correct dimensioning of the distribution system and the pump ensures that all consumers receive sufficient quantities of the medium. Problems can occur if too many points-of-use valves are opened simultaneously, resulting in a partial vacuum in the system. With their newly developed software Liprocontrol, Christ now offers a solution which permits comprehensive management of the points-of-use. This program permits the control and documentation of all accesses to the distribution system and thus a complete audit trail. In addition, it allows the current operating status of the water treatment system and of the process systems to be displayed graphically at any time. The software can, for example, be integrated into a compact media column made of stainless steel, together with the necessary T-valves to permit the consumption of e.g. Purified Water (PW) and the extraction of samples in accordance with the GMP guidelines. Various special versions are available, depending on the application (distribution of PW, HPW or WFI) and the temperature range (25, 45, 80 °C or pure steam).

▶ Christ AG
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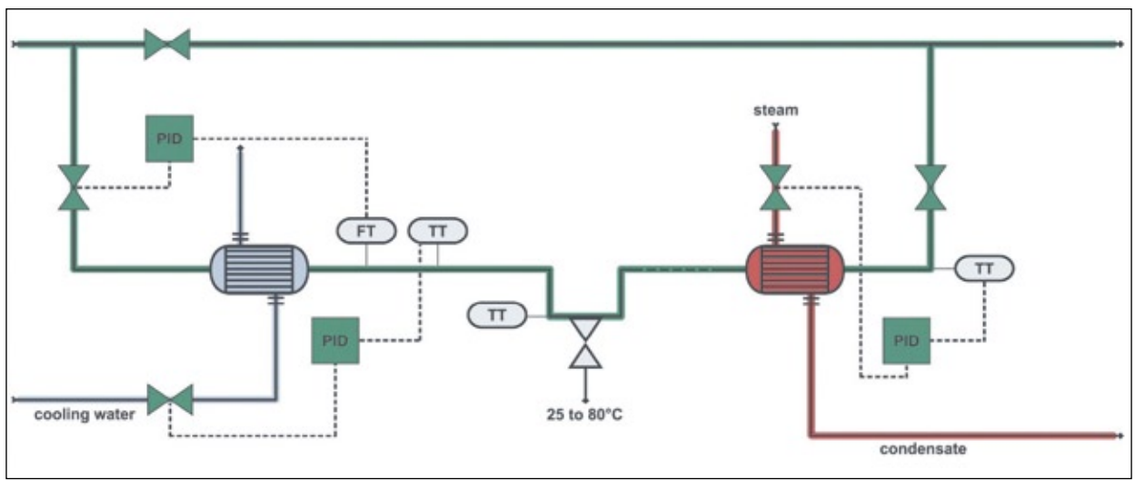
info@christwater.com
www.christwater.com



With the Liprocontrol software, Christ offers a newly developed program for the point-of-use management of in biopharmaceutical water systems. It permits the users to draw either hot or cold Pure Water. Various temperature levels and consumption quantities can be programmed.
Photo: Christ Water Technology Group

Outsourcing Popular In Pharma

None of the companies surveyed were planning to cut back on outsourcing. Stan Lepeak, managing director of research at Equaterra told the website outsourcing-Pharma.com, "Currently the pharmaceutical industry sits third or fourth in its overall level of outsourcing in these areas, along with the financial services, retail and automotive industries. However, these results indicate that the pharmaceutical industry is planning to expand in the areas of IT and BP outsourcing this year more than any of the other industries we surveyed." The report found that IT is the most commonly outsourced process in the pharmaceutical industry. About 17% are in the process of outsourcing and 22% reported that they have no plans to do so.

According to a recent study conducted by the consulting company Equaterra, more companies in the pharmaceutical industry than any other industry are set to increase outsourcing in the fields of information technology (IT) and business process (BP) year. Over 44% of the 25 pharmaceutical companies surveyed said they were planning to expand their outsourcing into new process areas. About 39% planned to expand outsourcing into new geographies or business units and 22% planned to expand in the existing process areas outsourced.

▶ www.equaterra.com

Merck Drug Gets EU Recommendation

The European advisory panel has recommended the approval of U.S. drug maker Merck&Co's Januvia, which is used to treat Type 2 diabetes. The Committee for Medicinal Products for Human Use of European Medicines Evaluation Agency gave the drug a positive opinion. Now the European Union must decide whether to act on the recommendation. The action is expected in early April. An approval would allow the sale of the drug in the 27 EU member countries. The U.S. Food and Drug Administration approved the drug in October 2006. It has also been approved in 10 other countries.

▶ www.merck.com

Organon BioSciences to be Listed

Akzo Nobel has previously announced its intention to separate its Pharma business, preferably through a listing of approximately 20–30% of Organon BioSciences shares on Euronext in Amsterdam in early 2007. Over the last few weeks, Akzo Nobel said it has received preliminary expressions of interest from a number of parties regarding an acquisition of Organon BioSciences.

Akzo Nobel said it has carefully reviewed these preliminary proposals from the perspective of long-term shareholder value creation. Taking into consideration the interests of all stakeholders, the company said it reconfirms that it remains committed to its preferred route of a separate listing of Organon BioSciences.

▶ www.akzonobel.com

chemanager@gitverlag.com


Peter Elverding


Feike Sijbesma

Peter Elverding to be Succeeded by Feike Sijbesma The supervisory board of Royal DSM has appointed Feike Sijbesma as chairman of the managing board with effect from 1 May. Sijbesma will succeed Peter Elverding, who will retire with effect from the same date. Elverding has been on the DSM Managing Board since 1995 and has been its chairman since 1999. Sijbesma has been a member of the DSM managing board since 2000.

▶ www.dsm.com


Andrea Danforth

New Human Resources VP at Codexis Codexis, a privately held biotechnology company, has named Andrea R. Danforth to the new position of vice president, human resources, reporting directly to Alan Shaw, president and CEO. Danforth will have responsibility for management of the company's global human resources operations. Danforth joins Codexis from Synarc, a global leader in medical imaging, biochemical markers and related services, where she served as vice president, human resources.

▶ www.codexis.com

AllessaChemie with New Executive Board The following organisational changes have entered into force at AllessaChemie: Messrs. Dr. Karl-Gerhard Seifert, Dirk Thomas, Berthold Fischer and Dr. Frank Schmidt have left the executive board. Dr. Karl-Gerhard Seifert has been appointed chairman of AllessaChemie's supervisory board. From now on, the company will be managed by a management executive committee, which has the following members: Dr. R. Helmut Rupp, executive director of research, development and technology, marketing and sales; Dr. Werner Spielmann, executive director production and technology; and Almuth Poetz, finances, administration, purchasing. Furthermore, AllessaChemie has generated the new Business Development group. This group consisting of several members under Dr. Hassler's management will specifically work on opening up new business fields.

▶ www.allessa.de


Patrick Thomas

New CEO of Bayer MaterialScience Patrick Thomas was appointed to chairman of the board of management of Bayer MaterialScience. Thomas succeeds Dr. Hagen Noerenberg, who ended his active employment with the Bayer Group as planned at the end of 2006. In 1999, Thomas joined U.S. chemicals company Huntsman Corporation as President of the Polyurethanes, Performance and Advanced Materials Divisions, also based in Belgium. In 2003 he was named Corporate Executive Vice President of Huntsman MatlinPatterson. After a brief spell as a management consultant for various private-equity companies he joined Bayer MaterialScience in August 2006.

▶ www.bayermaterialscience.de

Akzo Nobel to Appoint New General Counsel Akzo Nobel has announced that following an18-year career with the company, Jan Eijsbouts, general counsel and director of legal affairs, will retire on 1 June. Having spent 18 years working in various international legal capacities at Philips and DSM, Jan joined Akzo Nobel in 1989 as senior legal counsel for the Chemicals Group. In 1994, he joined the corporate organisation as senior corporate counsel before taking over as general counsel in 1999. Jan Karel van der Staay will join Akzo Nobel on 1 April and will be appointed general counsel and director of legal affairs as of 1 June.

▶ www.akzonobel.com


Pascal Juery

New Vice President Purchasing for Rhodia Group Rhodia announces the appointment of Pascal Juery as group purchasing vice president and member of the executive committee. Since 2004, he has been Rhodia Novecare's general manager for Europe, as well as the global business leader for the Home and Personal Care market.

▶ www.rhodia.com

New CEO of Schwarz Pharma Joins Executive Commitee of UCB UCB appointed Detlef Thielgen, Schwarz Pharma's new chief executive officer, to UCB's executive committee. In his career with Schwarz Pharma, Thielgen has held several positions in finance and controlling, including chief financial officer in the U.S. As general manager operations, he was responsible for the worldwide production and supply chain. Thielgen has been a member of Schwarz Pharma's executive board as chief financial officer since 2002.

▶ www.schwarzpharma.com

▶ www.ucb-group.com


Jürg Fedier

Ciba Specialty Chemicals Appoints New CFO The Board of Directors of Ciba Specialty Chemicals has appointed Jürg Fedier as new chief financial officer and member of the Chairman's Committee as well as the Operational Executive Committee. He will succeed Michael Jacobi in this position as of March 2007. Jürg Fedier currently is Head of Finance at Dow Chemical Europe and a member of the Executive Board. He has held a number of leading international positions in finance over the past 25 years, working in the U.S., in Asia and in Europe. Michael Jacobi (53) will leave the company following his wish to pursue a new career path after ten years as chief financial officer.

▶ www.cibasc.com

Susan K. Carter Appointed to Lyondell Board of Directors Lyondell Chemical Company announced that Susan K. Carter has been appointed to the Company's board of directors, effective Jan. 1, 2007. Carter is executive vice president and chief financial officer of Lennox International, a position she has held since 2004. Carter came to Lennox International from Cummins, where she had served as vice president, Finance, beginning in 2002.

▶ www.lyondell.com

David N. Schram New Vice President of Rohm and Haas Company The Board of Directors of Rohm and Haas Company elected David N. Schram as vice president of Rohm and Haas Company. Schram joined LeaRonal in 1973 and held various positions including research manager, corporate technical coordinator, and assistant vice president and director of Marketing, before becoming vice president of sales and marketing in 1994.

▶ www.rohmhaas.com

Amgen Names Yuji Orihara President, Amgen KK Amgen announced the appointment of Yuji Orihara to the position of president and representative director, Amgen KK, effective immediately. Amgen KK was formed in 1992 in Japan as a wholly owned subsidiary of Amgen (U.S.). Orihara will be responsible for all aspects of Amgen's commercial efforts in Japan and will be based at the Amgen headquarters in Tokyo.

▶ www.amgen.com

Please send requests/ideas to:
b.hertig@gitverlag.com

Sartorius Expertise


Dr. Uwe Gottschalk
Sartorius

Dr. Uwe Gottschalk, vice president of Purification Technologies at Sartorius, has accepted a lecturer's position at University of Duisburg-Essen, in addition to his duties at Sartorius, for the first master's degree in pharmaceutical medicine. This internationally focused study program is a first that is accredited throughout Germany and is designed to qualify medical and scientific students for managerial positions in research, development, approvals and marketing of pharmaceuticals and medical products. Gottschalk, a pharmaceutical expert, will manage the biotechnology study module and lecture on the development and production aspects of biopharmaceutical products. The lecturers of the master's degree in pharmaceutical medicine are from the pharmaceutical industry and health care institutes. Every two years, 25 students maximum are admitted to this program. The next college program will start in April.

▶ www.sartorius.com

Benchmarking Conference

The ECMSA (European Chemical Marketing and Strategy Association) and GEMS/MPI, will present the results of the first phase of the study "Benchmarking of Strategic Marketing in the Chemical Industry" at a conference on 29 March at 12 p.m. in Prangins, Switzerland. In addition to the presentation of the results, the conference will also include strategic marketing practice presentations by BASF, Dow Corning, DuPont and Dynea.

▶ ECMSA – The European Chemical Marketing and Strategy Association
Tel.: +31 70 312 39 26
info@ecmsa.org
www.ecmsa.org

Linde Wins Prize

Linde Medical Devices, a subsidiary of The Linde Group, received the "Ei des Kolumbus" (Egg of Columbus) award for its mobile Oxy-Gen lite oxygen generator from the "Stiftung Innovation" foundation. The innovation prize, which has been awarded by an independent jury for particularly useful and innovative products since 2004, was presented to Karl-Heinz Hecker, CEO of Linde Medical Devices. The medical oxygen generator Oxy-Gen lite uses electrolysis to produce high-purity oxygen from water. The hydrogen produced during this process is used to power an integrated fuel cell that serves to generate electricity. The device provides patients with chronic respiratory diseases with a source of oxygen that they can use at home.

▶ www.linde.com

DCAT Week 2007

The Drug, Chemical & Associated Technologies Association, Inc. (DCAT) is the premier business development association whose membership is comprised of companies that manufacture, distribute or provide services to the pharmaceutical, chemical, nutritional and related industries. During DCAT Week and the DCAT Annual Dinner held each March at the Waldorf Astoria in New York City attendees can make important contacts, dialogue with counterparts in other member companies and build relationships with current and potential customers. This year's event takes place 19–22 March. Sir Richard Branson will be the guest speaker during the DCAT dinner.

▶ lkuna@dcat.org
Tel.: +1 609-448-1000
Fax: +1 609-448-1944
www.dcat.org

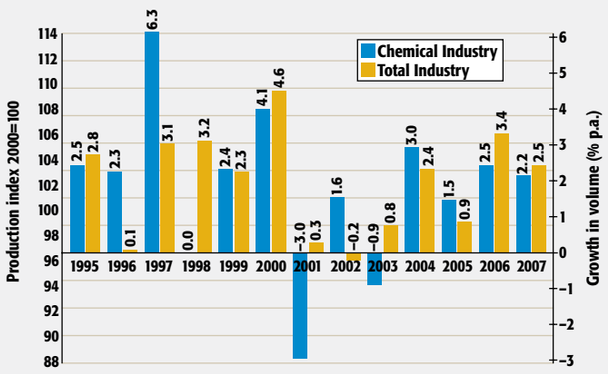
Impact India

India is fast-emerging as a hub for R&D, manufacturing, and information sciences in the global healthcare economy. Impact India will answer these questions and much more by providing attendees and unprecedented look into India's emerging pharmaceutical industry. The conference will be held 4–7 Feb. at the Hyatt Regency Delhi in New Delhi, India.

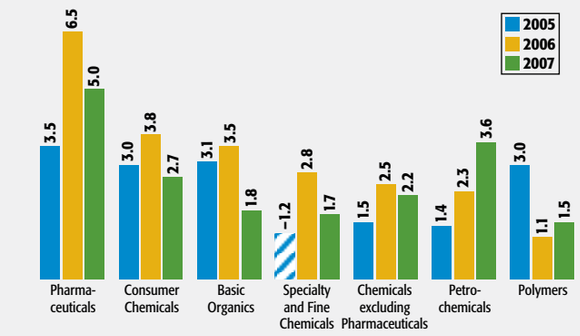
▶ Strategic Research Institute
Tel.: +1 800 599 4950
info@srinstitute.com

Chemical Industry: Outlook 2007

Production of the chemical industry in the EU compared with the total industry



Chemical production in the EU by sectors
Production (volume): growth rate (yoy)



Source: Cefic

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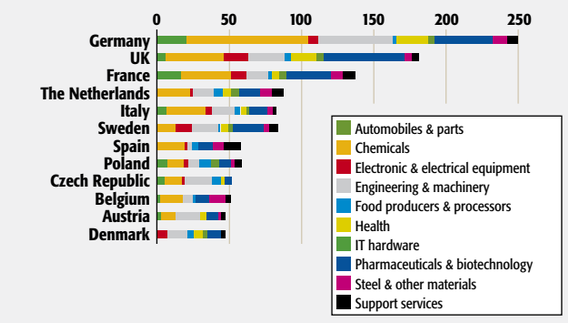
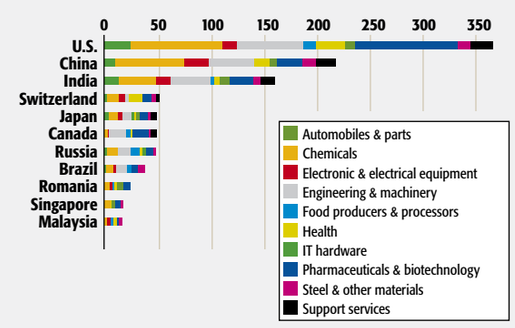
The year 2006 has been favourable for the European chemical industry. Cefic, the European Chemical Industry Council, expects output in the chemical industry (excluding pharmaceuticals) to grow by 2.5% in 2006, compared to 1.5% in 2005. The growth is clearly above the average growth rate over the last five years. Although the year 2007 may show a modest slowdown, the business of chemistry will remain robust, reaching growth of 2.2%. The European chemical industry has experienced a positive development during 2006. Chemicals business has improved strongly, mainly driven by the strong domestic demand and the dynamic growth of trade activities with the major EU trade partners. Chemicals sales have improved continuously since the beginning of the year. Domestic sales are expected to grow by 4.6% in 2006. This upswing in domestic sales has been mainly driven by the favourable business climate in most of our customer industries. This is leading to stronger domestic demand for chemicals in the EU.

R&D Business Trends

Popularity index of EU countries to locate R&D investment (including home country)*



Popularity index of non-EU countries to locate R&D investment*



*Countries ranked as most favourable = 3 points, as 2nd = 2 points, as 3rd = 1 point.
Includes only countries mentioned at least five times.

Source: EU Commission DG JRC-IPTS

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The "2005 EU Survey on R&D Investment Business Trends in 10 Sectors" is part of the Industrial Research Investment Monitoring activity carried out jointly by the Joint Research Centre (DG JRC) and Research (DG RTD) Directorates-General of the European Commission. This pilot survey on R&D investment business trends provides new insights into company expectations about future R&D investments and their motivations to invest in research. The results are drawn from the responses received from 449 companies covering 10 sectors. Taken together, the 449 responding companies are responsible for a total global R&D investment of almost €30 billion, which is a significant share of European business investment in R&D. In terms of weighted average, respondents expect their global R&D investments to grow by about the same rates for the next year and the next three years (around 5% p.a.). These expectations are determined by the sectors pharmaceuticals & biotechnology and chemicals, which together constitute more than 60% of the total R&D investment of the 449 companies in all 10 sectors.

Innovation In The Industry

Innovation ability of the leading industrial countries

Rank		Point score
1	U.S.	7.00
2	Finland	6.01
3	Sweden	5.83
4	Denmark	5.34
5	Japan	4.98
6	Germany	4.66
7	UK	4.52
8	France	4.27
9	Belgium	4.21
10	The Netherlands	3.90
11	Austria	3.46
12	Spain	1.21
13	Italy	1.00

Innovation ability of companies based knowledge intensive products and services

Rank		Point score
1	U.S.	7.00
2	Finland	6.72
3	Germany	6.44
4	Japan	6.15
5	Sweden	5.75
6	France	5.31
7	Belgium	5.26
8	UK	5.22
9	The Netherlands	4.77
10	Denmark	4.70
11	Austria	3.96
12	Italy	3.25
13	Spain	1.00

Source: Study of DIW Berlin: Innovation Indicator 2005

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On the basis of extensive data the "German Institute of Economy" (DIW) developed the "Innovation Indicator Germany". This innovation indicator compares Germany with 10 countries of the European Union: Belgium, Denmark, Finland, France, UK, Italy, The Netherlands, Austria, Sweden and Spain – as well as the U.S. and Japan. The U.S. and the Scandinavian countries are the market leader in the total ranking. Their success is based on their general high innovation ability. These countries have no weakness in all from the DIW analysed areas. Asian countries and middle- and east European countries are increasingly winning connection to the industrial countries. But their remarkable growth rates are based now less on original innovations, but rather on the imitation or modification of established technologies, on work intensive and standardised production or the extraction and processing of raw materials.

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Gold Clusters Stabilise Platinum Electrocatalysts

Platinum is the most efficient electrocatalyst for accelerating chemical reactions in fuel cells for electric vehicles. In reactions during the stop-and-go driving of an electric car, however, the platinum dissolves, which reduces its efficiency as a catalyst. This is a major impediment for vehicle-application of fuel cells. Now, scientists at the U.S. Department of Energy's Brookhaven National Laboratory have overcome this problem. Under lab conditions that imitate the environment of a fuel cell, the researchers added gold clusters to the platinum electrocatalyst, which kept it intact during an accelerated stability test. This test is conducted under conditions similar to those encountered in stop-and-go driving in an electric car. The research was reported in the 12 January edition of the journal Science. Brookhaven's Chemistry Department researchers Junliang Zhang, Kotaro Sasaki, and Radoslav Adzic, along with Eli Sutter from Brookhaven's Center for Functional Nanomaterials, authored the research paper.

In the unique method developed at Brookhaven, the researchers displaced a single layer of copper with gold on carbon-supported platinum nanoparticles. After being subjected to several sweeps of 1.2 volts, the gold monolayer transformed into three-dimensional clusters. Using x-rays as probes at Brookhaven's National Synchrotron Light Source, a scanning transmission microscope at Brookhaven's Center for Functional Nanomaterials, and electrochemical techniques in the laboratory, the scientists were able to verify the reduced oxidation of platinum and to determine the structure of the resulting platinum electrocatalyst with gold clusters, which helped them to gain an understanding of the effects of the gold clusters.

In the Brookhaven experiment, the platinum electrocatalyst remained stable with potential cycling between 0.6 and 1.1 volts in over 30,000 oxidation-reduction cycles, imitating the conditions of stop-and-go driving. "The gold clusters protected the platinum from being oxidized," Adzic said. "Our team's research raises promising possibilities for synthesizing improved platinum-based catalysts and for stabilising platinum and platinum-group metals under cycling oxidation/reduction conditions."

▶ www.bnl.gov

Harmonised Rules for Dangerous Goods Transport

The European Commission has proposed to harmonise the rules for the transport of dangerous goods by making them as user-friendly as possible. The new proposal integrates the existing rules into one piece of EU law, which covers all three land transport modes: road, rail and inland waterway. It contributes thereby to the Commission's strategic objective of legislative simplification. The EU law on transport of dangerous goods already covers road and rail transport, but in many separate, partly outdated sets of rules, which the proposal recasts into one set of rules only. For citizens, transport operators and national authorities the new format is much easier to understand and apply than the current one. The proposal also covers inland waterway transport, for which no EU rules currently exist. Even if being the smallest mode in volume, an accident in inland waterways might have serious consequences and an extensive impact. One single set of rules for all inland waterway transport of dangerous goods reduces this risk.

▶ www.ec.europa.eu

Coming up in issue 2/2007

- Interview with Jennifer Holmgren, director of UOP's new business unit Renewable Energy and Chemicals
- Biofuels today and tomorrow: An upclose look at the future of energy
- Time to act: New GHS procedures for classifying and labeling chemicals

Out on 28.02

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