



INNOVATION AWARDS 2008

In with a chance!

The time has come to reveal the shortlisted entries in this year's ICIS Innovation Awards. Which of these innovations will the judges select as the overall winner? All will be revealed on October 13

JOHN BAKER/LONDON

INNOVATION CONTINUES to be a key priority for chemical companies, both large and small. With new players entering the global market and continual pressure on costs and margins, there is a tremendous drive to come up with new products, processes and service offerings.

Effective innovation – the turning of ideas into profitable business activities – calls for research and development to be aligned with other functions in the enterprise, notably sales, marketing and manufacturing. It can be boosted through collaboration with customers, academia and even other companies.

Governments, too, have recognized that there is a need for innovation to maintain economic growth and keep industries vibrant and competitive.

To help foster this innovative drive, and promote and celebrate the best innovations, ICIS has, for the past five years, run the ICIS Innovation Awards, sponsored from the out-

set by Dow Corning. This year, as in previous ones, we have been rewarded by the quality and number of entries received.

On the following pages, we describe the best of those entries – the ones the panel of eminent judges has selected for this year's shortlist. These will go on to a second round of judging in late August, and the overall winners will be revealed in a supplement to *ICIS Chemical Business* on October 13.

This year, ICIS and Dow Corning decided to update the awards categories in line with important trends in the industry. Thus, we added two new categories: one for best overall business innovation, to reflect the fact that in these competitive times it is not just innovation in products and process that can reap great rewards; and one for best innovative approach to corporate social responsibility (CSR) – now growing in importance as companies seek to win greater public approval for their activities by showing their sustainability and wider concern for society and the environment.

We've kept the perennially popular category of best product innovation – the lifeblood of the chemical sector – and the award for the best innovation by a small and medium-sized enterprise (SME), reflecting the importance SMEs have in the innovative landscape.

I think readers will find the shortlisted entries up to the usual standard, and I hope they will prompt fresh thinking and sustained, if not renewed, efforts for innovation across the sector.

Many, if not all, of the entries this year have a common theme of sustainability and environmental improvement. It seems these concepts are at last being hardwired into the innovation process and the decisions on whether to develop specific projects or not.

The main goal of the awards is to stress the importance of innovation to the chemical industry and its sustainable future, and to celebrate its achievements. I look forward to meeting the people behind the winning entries when we celebrate their success at an awards ceremony and luncheon in London.

BEST PRODUCT INNOVATION

Braskem, Green Polymers Unit

Luis Felli

Bioethanol-based polyethylene

Brazilian petrochemical company Braskem has developed and is commercializing a process that uses ethanol derived from sugarcane to produce high density polyethylenes (HDPEs) and linear low density polyethylenes (LLDPEs), with the same properties as the oil-derived polymers. A pilot plant has been running since 2007 and plans are in place for a 200,000 tonne/year unit to start up in 2010.

The process, says Braskem, is cost-competitive when compared to the traditional route and has lower environmental impact, both in terms of energy input and reduced byproducts. Additionally, the polymer effectively "stores" carbon from atmospheric carbon dioxide (CO₂) until it is ultimately recycled for energy production. The company says 1 tonne of its PE removes 2.5 tonnes of CO₂ from the atmosphere.

Braskem has also developed biobutanol for production of biobutene to form copolymers with the bioethanol.

ExxonMobil Chemical and Tonen Chemical

Dr. Patrick Brant

Chemical battery separator films

US major ExxonMobil Chemical and its Japanese affiliate, Tonen Chemical, have significantly improved the performance of

lithium-ion batteries through the development of advanced technology battery separator films. Their latest innovation is a tri-layer coextrusion with a core layer combining polyethylene (PE) and ultra-high molecular weight polypropylene (PP). This, says ExxonMobil, improves both permeability and meltdown temperature while retaining proprietary separator characteristics.

The advances are important, as the Li-ion batteries are key to the development of hybrid and electric vehicles and other portable power uses, such as power tools and laptop computers. Using the coextruded film enables production of Li-ion batteries with two to three times the capacity of nickel-metal hydride batteries, enabling the use of smaller and lighter power sources.

Ciba, Home & Personal Care

Frank Bachmann, Menno

Hazenkamp and Johan Werner

Ciba Tinocat TRS KB2: a novel bleach catalyst for low-temperature laundry washing

Laundry washing is an energy-intensive business, but lowering the wash temperature from 60°C to 30°C, or from 40°C to 20°C could save 60% of energy use. However, most modern laundry powders use hydrogen peroxide as a bleaching agent to remove stains, and this does not function well at the lower temperatures.

To overcome this, the Swiss specialty chemical producer has developed a novel bleaching ingredient designed around a manganese-based catalyst, a Saltren-Mn(III) coordination complex, that accelerates the bleaching reaction between hydrogen peroxide and fabric stains. This makes available a significant amount of bleaching oxygen in short time. However, stresses Ciba, the bleaching system is selective and does not affect dyes and fibers in the clothes.

Bayer MaterialScience

Dr. Klaus Lorenz, Dr. Reinhard Albers, Don Wardius, George Combs and Steven Schilling High-performance polyurethanes made with new natural oil polyols

Polyurethane (PU) customers are, says German polymer producer Bayer MaterialScience, increasingly seeking renewable-based components in PU formulations, as they look for market advantage over competitive petroleum-based products. It has developed a range of tailor-made PUs using novel renewable polyols that incorporate natural oils into their structure.

A wide variety of natural oils can be used

in the innovative and efficient patented production process, which overcomes one of the main drawbacks of existing natural oil polyols, that of high viscosity and poor processability. Products with ultra-low viscosity can be produced with a renewable content as high as 70% by weight. These give improved flow properties in foam processing as well as better compatibility with a range of blowing agents. They can be used for rigid or specialty PU foams.

BEST INNOVATION BY AN SME

Virent Energy Systems

Dr. Randy Cortright and Dr. Paul Blommel

Production of hydrocarbon fuels and chemicals from plant sugars

Virent claims its *BioForming* technology for converting sugars to highly functional fuels offers a credible alternative to the existing fermentation, *Fischer-Tropsch* reactions and pyrolysis routes. Its novel pathway integrates proprietary aqueous-phase reforming technology with established catalytic processing techniques to convert plant sugars into hydrocarbon molecules, similar to those produced in a conventional petroleum refinery.

The US fuel technology company says *BioForming* can be cost-effective in the production of gasoline, diesel, jet fuel and chemicals, from a broad range of renewable feedstocks. Founded in 2002, it has proved the process at the pilot stage and has attracted interest from Anglo-Dutch oil major Shell, Japanese carmaker Honda and US agricultural giant Cargill. Development effort is now focusing on improving yield, product composition and cost, as well as scale-up to commercial production.

SIGNa Chemistry

Michael Lefenfeld, Dr. James Dye and Paul Vogt New stabilized alkali metals for safer, sustainable synthesis

With an affinity for donating electrons, alkali metals have enormous potential for speeding chemical reactions – in conventional industrial processes and in new reaction pathways. But their high reactivity makes them unstable and difficult to store and use.

US materials developer SIGNa Chemistry has overcome these problems by discovering a method for encapsulating the alkali metals in nano-scale porous metal oxides. The resulting sand-like powders take the danger and associated costs out of using reactive metals, while retaining their utility. SIGNa's materials can speed critical reactions

FUTURE FOUNDATIONS



Collaboration (noun): the act of working together with one or more people to achieve something

As an essential aspect of human society, the term collaboration is used in varying contexts in science, business, education and the arts. At Dow Corning, we see collaboration as fundamental to innovation. Not just in business and science, but through education and the creation of opportunities for future generations – our future innovators.

This year's ICIS Innovation Awards put collaboration in the forefront with a chance to recognize innovation in corporate social responsibility.

It has been incredibly rewarding for Dow Corning to team up with academia around the world to ensure students of all ages are receiving the tools and resources they need to excel in life and in work.

Whether it's helping underprivileged children, providing labs for university students or ensuring a village has access to clean water and power, collaboration and corporate social responsibility are the essence of good business.

Working together, we invent the future.

Dr. Stephanie Burns

CHAIRMAN, PRESIDENT AND CEO
DOW CORNING



Schoolchildren participate in a science class at Dow Corning's 30-acre (12ha) education center and nature reserve in Barry, Wales, UK. The education center utilizes sustainable resources. Ground source heating and solar panels provide heat and power, while rainwater is harvested and recycled to provide a water source.

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» by 80–90%, avoid unneeded process steps and enable continuous production. They can also address topical issues of safer and more sustainable chemical synthesis, environmental remediation and lower-cost energy sources.

BEST BUSINESS INNOVATION

LyondellBasell Industries, Procter & Gamble, PTI Europe and Alpla Werke

Mike Rogers (LyondellBasell), Patrick Etesse (P&G), Vincent Le Guen (PTI) and Nicolas Lehner (Alpla Werke)

Procter & Gamble and PTI develop breakthrough ISBM bottles using LyondellBasell's *Stretchene* PP resin for launch of *Ariel Professional* laundry bleach

Netherlands-based polymer specialist LyondellBasell worked closely with US consumer product giant Procter & Gamble, Swiss-based packaging consultancy PTI Europe and German converter Alpla Werke to design and produce innovative polypropylene (PP) bottles for packaging a new *Ariel* laundry bleach. The injection stretch blow-molded (ISBM) bottles, made from *Metocene* PP are said to outperform standard PP and to be lighter than polyethylene terephthalate (PET) bottles.

The innovation was the result of close collaboration and the coming together of new inroads in PP performance by LyondellBasell and innovative bottle design by P&G and PTI. P&G says that “the close cooperation between P&G and LyondellBasell was a critical aspect that enabled the success of this development.”

DSM Nutritional Products

Manfred Eggersdorfer and Klaus Kramer
Sight and Life project with the UN World Food Programme

In a joint initiative, Swiss-headquartered fine chemical producer DSM Nutritional Products and the UN World Food Programme have developed *MixMe* sachets to deliver micronutrients (vitamins and minerals) to developing countries that can be mixed at home with food to fortify it. This “home fortification” is a novel approach to delivering micronutrients and DSM had to overcome several hurdles. First, producing a stable and tasteless product and appropriate packaging, within specified cost parameters; second, identifying a suitable packaging facility that could respond with high volumes at short notice, and third, understanding and complying with the approval process of individual governments.

The contents of the sachet (polyethylene terephthalate (PET)/aluminium/polyethylene (PE) composite foil) are added to food just

THE JUDGES

ICIS has assembled a panel of eminent judges for this year's Awards

Dr. Monty Alger

is vice president and chief technology officer at Air Products and Chemicals



Larry Keeley

is president and co-founder of innovation strategy firm Doblin



Robert Kirschbaum

is vice president of innovation at DSM, focusing on performance materials



Prof. Rodney Townsend

is director of science and technology at the Royal Society of Chemistry and chairman of the EU's SusChem sustainable chemistry platform



Dr. Gregg Zank

is vice president, chief technology officer and executive director of science and technology at Dow Corning



before consumption, thus avoiding losses. Contents can be tailored for specific groups of people, and a year's supply of 150 for one person costs just €2.75 (\$4.32).

Cognis Care Chemicals

Bettina Jackwerth and Rita Koster

Green Chemical Solutions – helping customers choose how “green” they want to be

German specialty chemical producer Cognis's invention of Green Chemical Solutions (GCS) is based on product-specific data and provides clearer information at a glance. Each Cognis product is ranked on a scale of 1 to 4, indicating the proportion of renewable components and how it is processed.

The innovation picks up the consumer and industry trend to “green” solutions in the personal care and industrial and institutional cleaning products sectors, as well as the move to more “green” labeling schemes and

certifications. GCS includes three easy guides, covering product choice, product formulation and applicable regulations.

MOST INNOVATIVE CSR PROJECT

DSM NeoResins

Petri Mast, Wim Grisnich, Bart Reuvers and Jan Besamusca

Discovery high-performance ultra-high solids coatings resins for decorative paints

With its *Discovery* family of high solids decorative coatings, DSM has determined to move beyond the environmental requirements of the 2010 solvent emissions legislation in the EU, while delivering better performance for professional decorators.

At the heart of the innovation is a new *Hybrane* technology using hyper-branched polymers with high end-group functionality for fast network formation.

In introducing the concept, the Netherlands-based waterborne technologies producer has had to overcome the mental block that low volatile organic compound resin systems cannot be high performing, and to convince customers that laboratory data can be translated into actual paint properties.

Dow Chemical

Katie Howison

City wastewater effluent for industrial reuse project

Dow Chemical's 2015 sustainability goals are driving it to cut freshwater intake at its Terneuzen site, in the Netherlands, by 35%, compared with 2005. One approach has been to work with Dutch water treatment firm Evides and the municipal water board to reuse treated wastewater from the 55,000 Terneuzen residents on the Dow site as process water. Evides produces demineralized water from the household wastewater and the US chemical major uses the demi-water twice: to produce high-pressure steam, and as recycled water for its cooling tower.

The project overcame a number of distinct challenges, including the integration of infrastructure of three organizations, prejudice against reusing treated sewage water, and the use of new technology. Benefits include: sustainable reuse of 450m³/hour of purified wastewater; 65% reduction in energy use by avoiding desalination at Evides; and reduced effluent discharge to the river. The approach, says Dow, can be easily extended to other communities and companies worldwide. ■

» For further information go to www.icis.com/awards or email: john.baker@icis.com