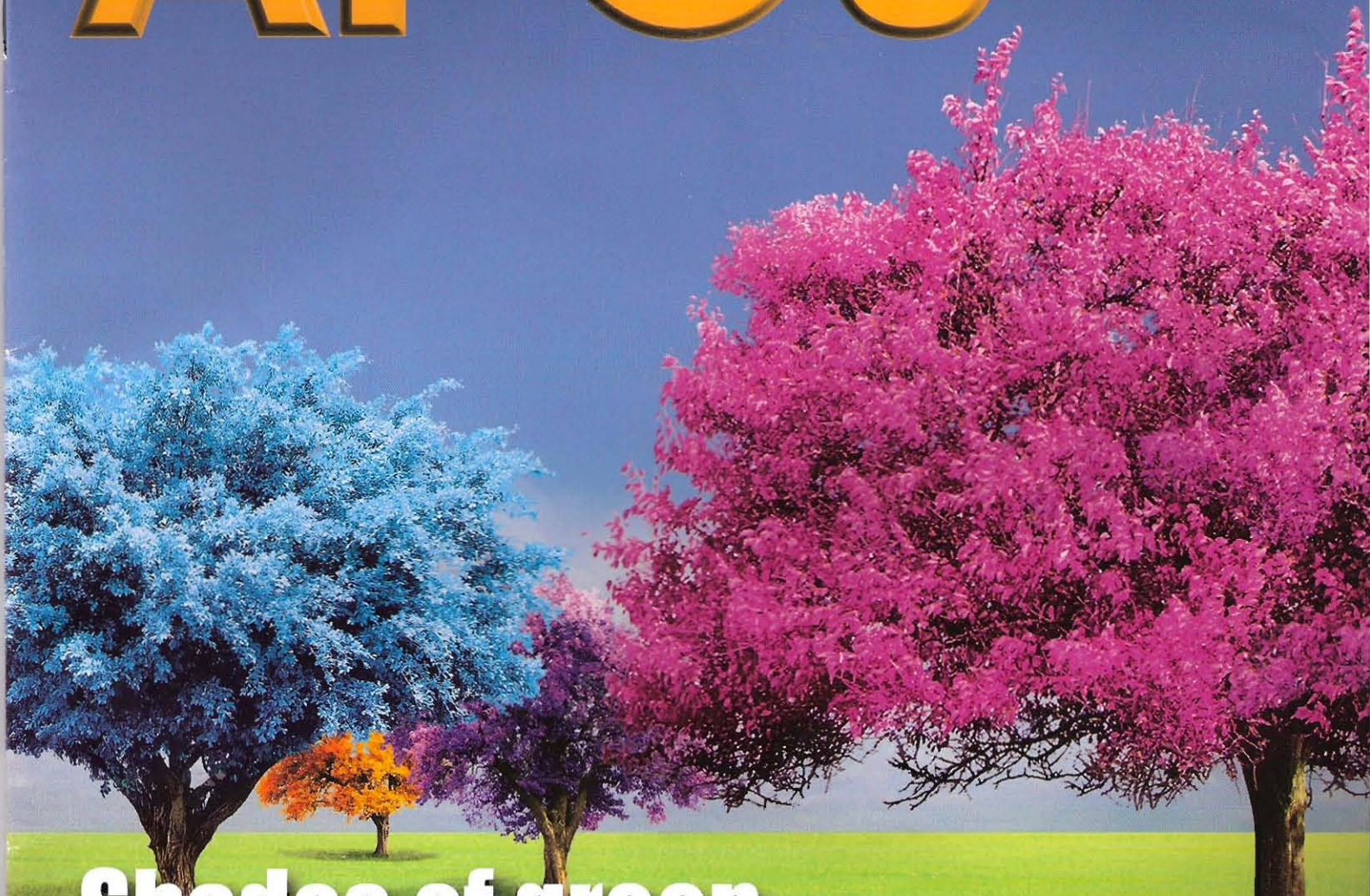


ASIA PACIFIC COATINGS JOURNAL

APCJ



Shades of green

Energy efficient architectural coatings

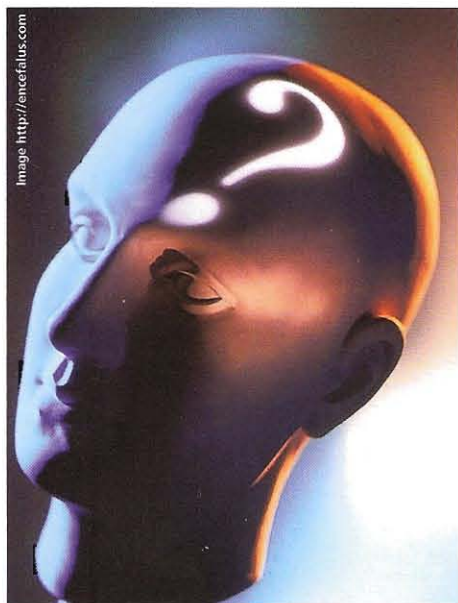
Sustainable & smart

Environmental solutions for nanocoatings

- Special effect pigments • Waterborne coatings • Smart coatings • Architectural coatings
- Region focus: APAC, ASEAN • Country focus: Vietnam, India

A smart coating developed with nanotechnology that combines the benefits of high performance with renewable resources has been developed by experts at Industrial Nanotech, to help manufacturers save energy and costs

Nanotechnology combines smart coatings and sustainability



Nanotechnology is one of the newest sciences being used to engineer materials and processes that have unusual and unique performance benefits. When working at the nanoscale level, materials take on characteristics not seen before, such as silver taking on antimicrobial properties. As a result, coatings that can do things that couldn't be done before have been an area of much research. With nanotechnology, it seems nearly anything is possible given enough time and brain power, including combining two areas of research – smart coatings and sustainable materials.

'Smart coatings' is the term used for coatings that do more than simply cover a surface. There are technologies in the process of being developed that will enable a coating to self-report and repair damages to its film – something that would be of particular help for miles of pipeline that need constant monitoring for any potential failures. There are coatings already on the market that can insulate effectively in a thin layer while also preventing corrosion, which is of great use for those same pipelines, tanks and other surfaces that suffer from corrosion under insulation. Smart coatings are also being developed to reduce friction, thus reducing the energy needed for many types of processes that involve moving parts and those which add anti-microbial properties to surfaces. Sustainable manufacturing is defined by the US Department of Commerce

as: 'The creation of manufactured products that use processes that are non-polluting, conserve energy and natural resources and are economically sound and safe for employees, communities and consumers.' Creating sustainable materials has been another area where nanotechnology is being tapped to find ways to provide the same quality product with less impact on the environment.

In 2004, one USA company managed to combine the two objectives and have created a line of nanotechnology-based smart coatings, which are also a sustainable material.

These are the same coatings that helped Coats – a market leader in industrial yarns and threads and consumer crafts – to solve its issue with energy efficiency in its plants (see case study below). Nansulate, a liquid insulation and protective coating technology developed and patented by Industrial Nanotech, is reported to be one of the first sustainable materials created with nanotechnology, which also provides significant energy saving benefits. No matter how strange it seems for a clear, thin film coating to provide an effective thermal barrier – the energy savings and temperature differences speak for themselves.

Another case study was performed with Henateks Textile, a manufacturer of clothing for large sports apparel companies. The group charted liquid natural gas consumption in its factory and compared the savings after the incorporation of the smart insulation coating.

CASE STUDY: SAVING ENERGY FOR COATS

Coats, a global market leader in industrial yarns, threads and consumer crafts was looking towards advanced technologies to improve its processes and reduce costs. Smart coatings, in particular, was a field considered to help increase sustainability.

One huge issue the company faced was reducing the energy consumption of its dye houses. In harsh and humid environments, there was no insulation suitable for use on its dye machines, so large amounts of energy were being lost.

The company looked into smart coatings developed with nanotechnology and, in 2008,

found a sustainable insulation coating that caught its attention. This is now the cornerstone of its global energy saving initiative to reduce energy consumption in plants worldwide by over 10%, decrease its carbon footprint by at least 2% and improve the working conditions of its dye houses.

About the group

Coats, based in the UK, is a company steeped in tradition. Founded in 1830, it has seen the advent of the industrial age and has experienced the evolution of manufacturing.

The group's products are used in everything from the red thread in major league baseballs to the safety cords on the NASA space shuttle.



Image: NASA, August 30, 1984

The group first installed the coatings on to dye machines, steam pipes, boilers and other heat producing equipment in 2007 and measured an energy cost saving that year of US\$392.28M and a reduction in liquid natural gas consumption of 1.1M m³.

In 2008, Henateks reported energy cost savings of US\$460.16M and reduction in liquid natural gas consumption of 1.1M Sm³. It charted overall energy savings at 20% due to the use of the nanotechnology-based smart coatings on equipment.

While energy savings through insulation may be the main draw of this coating line, the nanotechnology element means the products have even more to offer. In addition to using a nanocomposite with an extremely low thermal conductivity (0.017W/mK), which provides insulation benefits, the coatings are also highly resistant to moisture, corrosion, mould growth, UV, flame and chemicals. The product line also includes an NSF (The Public Health and Safety Company) registered coating, safe for use on incidental food contact surfaces, which is used by food manufacturers.

SUSTAINABLE BUILDING

In addition to using smart coatings for sustainable manufacturing, building designers and architects are also looking into the many technologies available to increase building sustainability and energy efficiency. There are architectural smart coatings available and being developed that can help make windows more stain resistant, insulate surfaces with a clear film layer that doesn't change aesthetics, make building exteriors resistant to graffiti and mould, and change colour depending upon temperature.

Michael Schofer, chief supply chain officer, Coats said: "As a business we have an ongoing commitment to reducing our impact on the environment and continuously improving the working conditions in our facilities worldwide. Having comprehensively tested Nansulate coatings we found they significantly reduced process energy whilst standing up to the harsh environment of an industrial dye house. We anticipate the change will have a dual effect: reducing our process steam consumption by over 10% and therefore our carbon footprint by around 2% and significantly improving the working conditions in our dye houses, which is great news for both our business and the environment."

Smart coatings that increase sustainability promise to become a major influence in how companies insulate equipment on manufacturing lines, improve energy efficiency in buildings, prevent corrosion of pipelines and more in the 21st century and beyond. As countries around the world race to discover and create advances in nanotechnology-based materials, including smart coatings, materials that provide a positive impact on the environment, continue to be at the top of their lists.

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BENEQ RECEIVES €9M INVESTMENT TO FURTHER THE DEVELOPMENT OF NANO-SCALE THIN FILM COATINGS

Finnish Industry Investment, Via Venture Partners and private investors have spent €9M on Beneq, the Finnish cleantech company. Beneq is a supplier of production and research equipment for advanced nano-scale thin film coatings used, for example, in solar cells, glass coatings and flexible electronics, such as OLED lighting.

Sampo Ahonen, CEO of Beneq commented on the move: "This investment in Beneq is, on the one hand, a definite sign of confidence in our corporate strategy, our technical expertise and our projected continued growth. On the other hand, it is also a guarantee of constant expansion and development of our services for our customer base, be that full-scale industrial production, research or R&D."

Beneq, founded in 2005, currently employs over 60 people in its headquarters in Vantaa, Finland and in its sales offices in Germany, China and USA. The company has exhibited an average annual growth rate of 93% during the last three years. In 2010, its turnover was approximately €10M. The

company is currently moving from piloting to industrial production.

Juha Lehtola, investment manager at Finnish Industry Investment commented: "Beneq is a pioneer in the Finnish nanotechnology sector. The company's technology and equipment bring added value, for example, to the production of solar energy and many other fast-growing application areas. The company has already proven its growth capabilities and we are expecting strong export-driven growth also in the future."

LOOKING TO THE FUTURE

Via Venture Partner has been an investor in Beneq since 2007 and has taken an active part in the company ever since.

Peter Thorlund Haahr, partner at the group comments: "Beneq is an extremely promising company with a strong management team that has proven capable of bringing Finnish technology to the global scene. We hope to find equally good investment opportunities in Finland in 2011."

HYBRID MATERIALS 2011

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