



The Future of Nanomaterials

Latest innovations and applications in packaging, paper and print
A two day Pira International conference



Tuesday 29 and Wednesday 30 June 2004

The Hyatt Regency, Birmingham, UK

Featuring case studies and presentations from:

Avery Dennison
Bayer Material Science
Cranfield University
ETC Group
Faraday Partnership
GlaxoSmithKline

Honeywell
Imerys
Institute of Nanotechnology
Mitsubishi Gas Chemical
Nanocor
Nanoplex Technologies
Nanoventions

Ntera
Paul Holister
Pira International
Procter & Gamble
Qinetiq Nanomaterials
Thomas Swan and Company
University of Strathclyde

Media partners:



The nano revolution

The price tag placed on the commercial impact of nanotechnology is set to be US\$3.5 billion over the next 4 years. Growth on this scale means that nanotechnology, (material engineering at a molecular level) is set to be not only the biggest technological breakthrough since the industrial revolution but also a hugely lucrative business. Already applications in everything from biomedical to automotive industries are capturing the imagination of scientists and the funding of governments and large corporations. It is time to find out what nanotechnology could mean for your business and how you can tap into the technological and economic potential.

Your nano future

For paper, packaging and printing companies nanotechnology represents a seemingly endless array of opportunities and challenges. Breakthroughs in pigments and inks will revolutionise print process, substrate design and visual impact. New intelligent nano materials may not even need to be printed at all as their ability to convey colours and images can be manipulated at structural level. Packaging materials in both paper and plastics will change significantly with the opportunity to provide higher barrier properties and improved shelf life. Many companies are already active in this area but current achievements only touch upon the wealth of future possibilities. Nanotechnology can be used to build intelligence into substrates from nano barcodes to conductive nano wires. New breakthroughs and discoveries are happening at a frenetic pace. Discover what the nano future holds for you, your business and your customers.

The conference programme

This two-day conference programme will address the industry's most important questions about nanotechnology.

- **Key markets and sectors** where nanotechnology applications will first appear. Including detailed analysis of time scales, when these markets are expected to take off, their growth potential and future opportunities.
- **Commercialising nanotechnology** into a mass manufacturing environment. Technical details of challenges for converters and an assessment of the challenges for the whole supply chain.
- **Cost benefit analysis**, providing expert assessment of the business case for nanotechnology. The programme features a summary of when and where nanotechnology is economical and makes comparisons with conventional means of achieving the same objectives.
- **The key players** in nanotechnology. An exclusive insight into who is doing what. This will feature presentations from the leading suppliers of nanotechnology, case studies from print, paper and packaging companies already active in this market as well as first hand views from market driving end-users.

The Future of Nanomaterials

Two day Pira International conference

Tuesday 29 June 2004

08.30 Registration and refreshments

Strategic considerations for nanomaterials

09.30 **Chairman's opening address: what does nanotechnology mean for you?**

- Implications for packaging, paper and print industries
- A summary of current and future technologies
- Predicted markets and applications with scope for significant growth and development
- Exploring the potential for shifting the boundaries of material applications ie. nano enhanced plastics able to tackle traditionally exclusively paper markets
- Growth challenges and opportunities

Dr. Graham Moore, Head of Strategic Consultancy, PIRA INTERNATIONAL, UK

09.50 **End-user requirements from nanocomposites/nanotechnology**

- A wish list of new developments
- Cost benefit analysis for the end-user
- Prioritising technology breakthroughs to focus on key applications
- Future hopes and objectives for nanocomposites/nanotechnology

Emily Boswell, Senior Scientist, PROCTER & GAMBLE, UK

10.25 **A summary of the current state of the market for nano enabled materials**

- The application space for nano enabled materials: what, when and how big?
- The players: from start-ups to global chemical and material companies – who's doing what?
- Investment: government, corporate and venture capital – what is happening and what's likely to happen for each application?
- Geographical comparisons of markets and players
- Synergies and interactions to keep an eye on

Paul Holister, INDEPENDENT CONSULTANT, France

11.00 Morning refreshments

11.20 **Addressing safety and environmental issues**

- Understanding current and future consumer perception
- Analysing potential environmental and societal impact
- Health and toxicity issues
- Future legislative scenarios for nanotechnology

Jim Thomas, ETC GROUP, UK

11.55 **Nanotechnology today: real life examples of nano applications**

- Current impact on print, paper and packaging
- Three case studies of current applications
- Future scenarios in print, paper and packaging

Del Stark, Business Development Manager, INSTITUTE OF NANOTECHNOLOGY, UK

12.30 **Panel discussion: end-user views on nanotechnology**

What do brand owners want from nanotechnology?

This session will feature input from PROCTER & GAMBLE and GLAXOSMITHKLINE

13.00 Lunch will be served for speakers and delegates

Building intelligence into packaging through nanomaterials

14.00 **Nanotechnology to track and protect packs**

- Track and trace solutions using nanotechnologies
- Nano barcodes in packaging applications
- Protecting your brand through nanotechnology
- Future supply chain possibilities
- Could nanotechnology be a supply chain revolution?

Michael Natan, Chief Executive Officer, NANOPLEX TECHNOLOGIES, US

14.35 **Using nanotechnology to protect your brand**

- The science behind nanotechnology optical films
- Optical films for tamper indication
- Nanotechnology optical films for overt (naked eye) authentication
- Optical nanotechnology materials for covert authentication
- Packaging enhancement by nanotechnology optical films
- Future developments

Rick Steenblik, Chief Technology Officer, NAONOVENTIONS, US

15.10 Afternoon Refreshments

15.30 **Using nanotechnology to measure and influence packaging interfaces**

- The interfaces of pack materials with external and internal environments
- Measuring techniques
- Using nanotechnology in coating applications to change surface behaviour
- Using nanotechnology in diagnostic applications

Professor Jeremy Ramsden, Chair of Nanotechnology, Advanced Materials Department, CRANFIELD UNIVERSITY, UK

16.05 **Nanotechnology in paper-like display applications**

- A description of the technology
- Target markets and cost benefit analysis
- Potential for applications in print, paper and packaging
- Future possibilities

David Corr, Chief Technology Officer, NTERA, Republic of Ireland

16.40 **Intelligence inks: a novel nanotechnology irreversible oxygen indicator**

- Modified atmosphere packaging (MAP)
- Intelligent packaging: intelligence inks
- Oxygen indicators for MAP
- Current oxygen indicators
- A novel nanotechnology irreversible oxygen indicator

Professor Andrew Mills, Head of Physical Chemistry, UNIVERSITY OF STRATHCLYDE, UK

17.15 Closing remarks from the chair and end of day one

Wednesday 30 June 2004

08.30 Registration and refreshments

09.10 **Opening remarks from the chair: Del Stark, Business Development Manager, INSTITUTE OF NANOTECHNOLOGY, UK**

Improving material performance through nanotechnology

09.20 **Latest innovations to enhance barrier properties in plastics and films**

- Key breakthroughs in nano composites for plastic packaging
- Choosing between barrier enhancement options
- Addressing current technical challenges
- Impact on transparency
- Comparing nano clays with other new developments for enhancing barrier properties

James Radford, Technical Sales, NANOCOR and MITSUBISHI GAS CHEMICAL, US

09.55 **Using nanotechnology to provide active and passive barriers in beverage packaging applications**

- Using clay particulate to provide high barrier protection
- Active nano dispersion oxygen scavengers
- Integrating and combining nanotechnology into materials
- Case study – converting using nano materials
- Case study – brewers, views of nanotechnology

Russell Conway, Marketing Manager, Europe, HONEYWELL SPECIALITY POLYMERS, UK

10.30 Morning refreshments

10.50 **Electrostatic self assembly (ESA) of nanomaterials on plastic substrates**

- The process: roll to roll high speed ESA
- The resultant nano coated products
- The applications: improved barrier properties, anti microbial coatings and conductive coatings

Ramin Heydarpour, Technical Director, Avery Research Centre, AVERY DENNISON, US

11.25 **Nanotechnology in paper coatings: seeing an old industry in different ways**

- Mechanisms of optics, coverage and ink interactions understood in terms of coating structure
- New analytical techniques allow us to characterise minerals more precisely
- Identifying and selecting novel nano dimensional materials
- Assembling building blocks to develop useful structures
- Interactions of different nano dimensioned minerals build shape engineered structures

J Philip E Jones, Director, Technical Marketing and New Ventures, IMERYS, US

12.00 Lunch will be served for speakers and delegates

Manufacturing nanomaterials on a commercial scale

13.20 **Panel debate, matching academic solutions to commercial problems**

- Finding mutual opportunities
 - Focusing on industrial applications
 - The need for short term financial results
- Chair: Dr. Walter Lewis, Managing Director, FARADAY PARTNERSHIP, UK**
Panel Members: Jeremy Ramsden, Chair of Nanotechnology, CRANFIELD UNIVERSITY, UK, Harry Swan, Nano Materials Business Manager, THOMAS SWAN AND COMPANY, UK

13.45 **Improving conversion techniques and material properties through polyimide nano composites**

- PA nanocomposites for extrusion applications
- Nano composites in extrusion coating applications
- Improved stability and reliability in the coating process
- Enhancing film production through nanotechnology
- Significantly improved barrier and material strength

Dr. Ralph Ulrich, R&D Polyamide, Dipl. Ing. Wolfram Littek, Market Service Processing, BAYER MATERIAL SCIENCE, Germany

14.20 Afternoon refreshments

14.40 **Manufacturing considerations for nanotechnology**

- Practical considerations for working with nano materials
- Current methods of manufacturing
- Applying current methods to large scale volume manufacturing
- Choosing between in house skills and technology development vs partnerships

Dr. Mike Pitkethly, Commercial Director, QINETIQ NANOMATERIALS, UK

15.10 **Manufacturing carbon nanotubes on a commercial scale**

- An introduction to the technology, applications and manufacturing process
 - Short term applications in print, paper and packaging
 - Longer term and blue sky applications
- Harry Swan, Nano Materials Business Manager, THOMAS SWAN AND COMPANY, UK**

15.45 **Chairman's closing address: The nano future – blue sky applications for nanotechnology**

- Nano 2020: what will we have achieved?
- Nano in our future lives as consumers
- Nano's long term opportunities in the print, paper and packaging industry

16.00 Close of conference

Live Webcast of the whole Pira conference broadcast to your office!

Get the most important information from the conference live to your office

- No cost for flights and accommodation
- No time out of the office
- Access any presentations
- Real time access to all the conference debate and questions
- Get copies of the presentations to keep after the event
- Join in live conference debate to give your views and ask your questions

This new Pira service gives you access to the whole conference delivered live to your office. The powerpoint slides will be delivered over the web to your computer and the audio will be delivered to your phone; all synchronised and in real time. You will even have the opportunity to participate in the question and answer session by submitting your questions by email.

How to book: simply tick the correct box on the back of the brochure and return to us. We will send you detailed instructions on how to participate.

What advantages will you gain by attending?

Brand owners, packaging converters and packaging material and equipment suppliers:

Gain an exclusive insight into how packaging can be enhanced through nanotechnology. Benefit from insights into cutting edge technology you can implement now and revolutionary new breakthroughs for the future. Get ahead of your competition by discovering how nanotechnology can enhance your packaging and your business.

Paper mills, board mills, suppliers to the paper and board industries, end-users of paper and board:

Learn how paper properties can be enhanced through nanotechnology. Discover the most recent technology to build intelligence into substrates and the very latest material engineering techniques to improve opacity, ink retention and brightness. This programme will inform your investment decisions, making sure you work on the right R and D with the correct suppliers.

Printing companies, press manufacturers and ink suppliers:

Discover the real issues of nanotechnology in printing. Gain focus into time scales and feasibility for nano enhanced inks and materials. Get an exclusive insight into time scales for the potential future market and an understanding of what you need to do today and tomorrow to be ready for nanotechnology.

Your event organiser

Pira International is the leading independent research centre for consultancy, training and information services, providing innovative business solutions to companies in packaging, printing, paper, publishing and retail supply chains. Our high profile international conferences regularly attract senior level delegates from leading companies around the globe to discuss and learn about new technologies and best business practices.

Exhibition and sponsorship opportunities

The Future of Nanomaterials, will provide suppliers of nanotechnology with a unique platform to showcase products and services to an audience of decision-makers including: brand owners, packaging converters, paper mills, printing companies and many more.

During the refreshment and lunch breaks you will be able to network with potential clients to demonstrate how your technologies and services can enhance their products. If you have the latest nanotechnology to launch – a hosted drinks reception or luncheon could provide the perfect opportunity to unveil it. Alternatively, if you simply wish to highlight and underline your position in the market then there are many packages that can be tailored to meet the specific objectives and requirements of your organisation.

To find out how **The Future of Nanomaterials**, can enhance your company's profile please contact Caroline Potapa, Exhibition and Sponsorship Sales Manager
 T: +44 1372 802101
 E: carolinep@pira.co.uk

Registration form

Date **Tuesday 29 and Wednesday 30 June 2004**

Venue **The Hyatt Regency, Birmingham, UK**

The Future of Nanomaterials

Two day Pira International conference

Step 1 Fill in your details

Mr./Mrs./Ms./Other First Name Surname

Position

Organisation

Address

..... Postcode

Telephone Fax

Email

Company business

Step 2 Choose your event options

Conference fees

Please tick the appropriate box

Conference fee: €1519 £999 \$1799

Pira members conference fee: €1369 £899 \$1619

Webcast only fee: €1199 £799 \$1439

VAT at the prevailing rate will be charged as applicable

Please enter your 9 digit membership number here:

Step 3 Select your payment method

Payment details

Please tick the appropriate boxes

Cheque or banker's draft Please make cheques payable to Pira International

Please invoice my company

Credit card payment

Payment by credit cards

Visa Mastercard American Express

Card number

Expiry date

Name and address

of cardholder

Please charge to my credit card the amount shown above.

Banker's information for credit transfer payments: Lambeth North Branch, P.O.Box 7929, 91 Westminster Bridge Road, London SE1 7ZB

Sterling A/C

Branch Sort Code: 60-60-04 Account No: 15040895
Swift Code(BIC) NWBK GB 2L IBAN: GB72 NWBK 6060 0415 0408 95

Euro A/C

Branch Sort Code: 60-60-04 Account No: 02958317
Swift Code(BIC) NWBK GB 2L IBAN: GB41 NWBK 6072 1402 9583 17

US Dollar A/C

Branch Sort Code: 60-60-04 Account No: 02385627
Swift Code(BIC) NWBK GB 2L IBAN: BB43 NWBK 6073 0102 3856 27

Please tick this box if you do not wish your name to be passed to a third party

Signature Date

Pira Registration No. 3858270

Brochure registration code:

Step 4 Send us your booking form

Fax Fax this form back to **+44 (0)1372 802243**

Phone Book by phone on **+44 (0)1372 802164**

Post Send this form by post to: **Pira International,
Randalls Road, Leatherhead, Surrey KT22 7RU, UK**

Online Complete the online booking form at **www.piranet.com**

Conference information

Venue details

Situated in the hub of Birmingham, the Hyatt Regency overlooks the impressive Centenary Square. The hotel is easily accessible by air, rail and road. It offers the highest available luxury and comfort and has a renowned reputation for excellence service. Its vast facilities and excellent location make it the definitive Birmingham venue and the beautiful symphony ballroom provides a superb backdrop for this event. www.birmingham.regency.hyatt.com

Accommodation

Delegates are responsible for organising their own travel and accommodation. A limited number of rooms have been reserved for conference delegates wishing to stay at the Hyatt Regency at a reduced rate of £158 per person per night. To book your accommodation please contact our booking agent Banks Sadler who will be happy to help arrange accommodation to suit any taste of budget.

Tel: 0207 424 3344 Email: CAR@banks-sadler.co.uk
Fax: 0207 424 3349

Getting there

The Hyatt Regency is located in the centre of Birmingham, just a short walk from Birmingham New Street Railway Station and seven miles from Birmingham International Airport. By road it is just two miles from both M5 and M6.

Conference fees

The conference price includes full documentation, lunch, and refreshments. However, fees do not include delegate travel and accommodation.

Cancellations

Cancellations will be accepted and fees will be refunded (less 20% handling charge) only if made in writing and received ten working days before the event. Bookings cannot be cancelled or fees refunded thereafter. Substitutions may be made at any time, please notify Sarah Stevens.

Note

Pira International does not accept liability for any loss of or damage to the personal effects of delegates attending the conference. Pira reserves the right to cancel, defer or modify the event proceedings without prior notice.

Visas

Delegates requiring visas should contact Pira International in advance and are responsible for leaving sufficient time for visa applications to be completed. Visa applications can only be submitted after conference fees have been paid. Conference fees will be refunded if visa applications are unsuccessful. Once Pira have sent the request to the embassy, there is nothing further we can do to speed up the process.

Incorrect mailing?

If you would like us to change any of your details or remove your name from our database, please contact our Database Department on +44 (0)1372 802019. Please allow two weeks for amendments to take effect.

Your event team:

For further information please contact:

Conference Manager: **Ciaran Little**
T: +44 (0)1372 802039
E: ciaranl@pira.co.uk

Conference Co-ordinator: **Sarah Stevens**
T: +44 (0)1372 802046
F: +44 (0)1372 802243
E: sarahs@pira.co.uk

Marketing Executive: **Caroline Fisher**
T: +44 (0)1372 802047
E: carolinef@pira.co.uk

Nanotechnology in Packaging

By Graham Moore

**A technology study
by Pira International**

Published March 2004

Price: £295/€430/\$530



This exciting new technology study from Pira International provides insight and analysis into the opportunities and challenges nanotechnology represents for your business.

Nanotechnology refers to material engineering at molecular level. Recent scientific breakthroughs in this area promise it is going to be the most significant disruptive technology since the internet. Whatever your role in the packaging industry, this technology will impact on you and your business.

This new study will take you through the opportunities and challenges nanotechnology represents for your business. It will explore the ability of nanotechnology to revolutionise the way materials are designed, manufactured and used. It is a technology and a study not to be ignored!

Topics covered include:

- The evolution of nanotechnology
- Commercial applications
- Tools
- New and improved materials
 - Nanoparticles
 - Nanocomposites
- Electronics and IT
- Environment and energy
- Packaging
 - Tag and trace applications
 - Sensory packaging
- Timescales to realisation

See enclosed flyer for special offers or visit www.piranet.com

Latest technology and applications for Printed Electronics – Impact on printing, paper and packaging

October 2004, London, UK

Brand new conference

Printed electronics are electronic circuits formed from organic semiconductors which can be printed directly onto a substrate as a soluble solution. Their new applications in displays, radio frequency identification (RFID) and printed batteries along with their potential to replace silicon and cut costs in the supply chain make these very exciting new technologies. Delve into this cutting edge world at Pira International's new two-day conference.

Following on from the success of January's Impact Forum, this programme will be bigger and more comprehensive in scope. The event will provide practical and technical information on how to make printed electronics a reality and how to identify the key commercial drivers for doing so.

Expert programme will include:

- Integrating printed electronics into the manufacturing process
- Current and future market projections by material, deposition technique and application
- The key players: which companies are likely to dominate this market?
- Analysis of different end-user markets: power sources, displays and RFID
- Strategic considerations for printed electronics
- Comparison of different deposition and printing technologies
- Obstacles to manufacturing printed electronics on a commercial scale
- Manufacturing methods driving the industry forward
- A review of new applications, emerging markets and developments
- Developments in inks, polymers and substrates

For more information,
please contact Issy Catalao
T: +44 (0)1372 802164
E: issy@pira.co.uk