

‘Harnessing the Power of the Mighty Particle’

‘Nanoparticles for European Industry – *Manufacture, Scale-up, Stabilization, Characterization and Toxicology*’.

2nd/3rd May 2006 – The Olympia Conference Centre, London

2nd May 2006; Day 1

08.45 – 09.15 Registration and Refreshments

09.20 – 09.30 Welcome and Introduction

*Ottilia Saxl
Institute of Nanotechnology*

1. Nanoparticle Manufacturing Techniques:

09.30 – 09.50 Session Keynote: ‘Nanoparticle Manufacturing and Scale Up – Meeting Industry’s Needs’

*Paul Reip
Founder and CTO
QinetiQ NanoMaterials*

- Nanomaterials are facing challenges, and they are getting bigger.
- Progress is accelerating, in many areas.
- The nascent industry still has a way to go to fully match non nano industry requirements.
- An example of a new highly innovative programme will be discussed.

09.55 - 10.15 ‘Nanoparticle Roadmaps – A Guide to Future Activities Worldwide?’

*Alan Smith
MNT Network*

- Roadmaps carried out in Europe and the United States indicate gaps in our knowledge of nanoparticles.
- How it is proposed to fill them; and how this may direct future funding.

10.20 - 10.40 ‘New Routes to Nanocomposite Manufacturing’

*Dr Stephan Barcikowski
Lazer Zentrum Hannover*

- The preparation of pure nanoparticles using femtosecond laser ablation without using precursors.
- Direct (in-situ) dispersion into nanocomposites.
- Proposed biomedical applications.

10.45 – 11.05 Coffee Break

11.10 – 11.30 ‘Synthesis of Nanoscale Metal Particles by Ultrasonic Spray Pyrolysis’

*Prof. B. Friedrich
Aachen University*

- The synthesis of nanoparticles of metals by ultrasonic spray pyrolysis method.
- Scale up of synthesis by ultrasonic spray pyrolysis method.
- Limited powder production by USP method.

11.35 – 11.55 ‘A UK Industry Perspective of the Challenges in the Manufacture and Scale-up of Carbon Nanotubes’

*Harry Swan
Thomas Swan & Co*

- Carbon Nanotube Manufacturing
- Scale-up from lab to commercial production
- Quality and Analytical Challenges
- Health and Safety
- Developing Markets

2. Nanoparticle Toxicology:

- 12.00 – 12.20** **Session Keynote: ‘Nanoparticle Toxicology – A Perspective on Hazards and Risks’** *Prof Anthony Seaton
Institute of Occupational Medicine*
- Most nanotechnologies imply little or no hazard to human health.
 - Experience with asbestos and air pollution suggest nanoparticles might have properties that make them more hazardous than the same material in bulk form.
 - The implications of this in relation to protection from possible risk.
- 12.25 – 12.45** **‘Nanoscience, Cosmetics and the Skin: Is There a Health Risk?’** *Gerhard J. Nohynek
Director
L’Oreal R&D*
- Cosmetic nano-formulations and the skin.
 - Nano-sized mineral pigments in sunscreens.
 - Toxicity and skin penetration aspects of nanomaterials used in cosmetics.
 - Is there a health risk?
- 12.50 – 13.45** **Lunch**
- 13.50 – 14.10** **UK Minister’s Presentation: ‘Developing Appropriate Control of the Risks Posed by Nanotechnologies’** *Elizabeth Surkobic
DEFRA*
- 14.15 – 14.35** **‘Nanoparticles and Nanomaterials – Economic and Social Benefits’** *Del Stark
ENTA*
- Already nanoparticles are forming the basis of many new products.
 - Likely benefits to health and welfare, society, the environment and the economy are outlined.
- 14.40 – 15.00** **‘Alternatives to Animal Testing in Nanotoxicology Research’** *Dr Enrico Sabbioni
ECVAM, Ispra, Italy*
- Animals and / or *in vitro* systems?
 - The need of *in vitro* mechanistically-based studies relevant to human exposure.
- 15.05 – 15.25** **‘Nanoparticle Toxicology – Clinical Studies’** *Dr Antonietta Gatti
University of Modena, Italy*
- Human pathologies related to an exposure to micro and nanoparticles.
 - Identification of chemical composition of nanoparticles and their identification in the environment.
 - Safety of nanoparticles and preventative procedures.
- 15.30 -15.50** **Tea Break**

3. Industrial Uses of Nanoparticles:

- 15.55 - 16.15** **Session Keynote: ‘Potential Applications of Nanoparticles in Home and Personal Care Products’** (presentation not included in post-event proceedings CD) *Jim Darwent
Vice President
Corporate Research
Unilever*
- An overview of the opportunities that Unilever sees for the application of nanoparticles in products for home care, skin care, tooth care and hair care.
 - Unilever’s approach to likely production routes as well as

potential health risks.

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| 16.20 – 16.40 | ‘Dispersion of nanoparticles in a liquid during product formulation’ <ul style="list-style-type: none">▪ Overview of PROFORM (Transforming nanoparticles into sustainable consumer products through advanced product and process formulation).▪ Outlines of comparative equipment performance. | <i>Dr N. Gül Özcan-Taşkin
BHR Group Limited</i> |
| 16.45 – 17.05 | ‘Inorganic Fullerene-like Nanoparticles for Industrial Applications’ <ul style="list-style-type: none">▪ Make enabling nano-materials for formulation into finished products.▪ Features, production and advantages of Inorganic Fullerene-like Nanoparticles.▪ NanoLub Technology. | <i>Dr Menachem Genut
President and CEO
NanoMaterials Ltd</i> |
| 17.15 | End of Day 1 | |
| 17.20 – 19.00 | Drinks Reception | |

‘Nanoparticles for European Industry – *Manufacture, Scale-up, Stabilization, Characterization and Toxicology*’.
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3rd May 2006; Day 2

09.00 – 09.20 Registration and Refreshments

09.20 - 09.25 Introduction to Day 2

4. Nanotubes and Carbon Nanotubes etc

09.25 – 09.45 Session Keynote: ‘Overview of CNT Status Production Technologies, Application Areas, and Volume & Price Evolutions’ *Laszlo Bax
Willems & van den Wildenberg*

- Key pros and cons of major production technologies.
- Barriers to breakthrough; stage of research for some main areas. *Dr Wolfgang Maser*
- Risk versus reward comparison of main potential applications. *Nanozar S.L.*

09.50 - 10.10 ‘Carbon Nanotubes: Synthesis, Processing, and Composites’ *Dr Milo Shaffer
Imperial College, London*

- Introduction to carbon nanotubes and their properties relevant to composite applications.
- Indication of current progress in nanotube polymer composites.
- Opportunities in reinforcing delicate structures, including polymer fibres and foams

10.15 - 10.35 ‘Multifunctional Nano-Composite Capsules - Manufacture and Use’ *Dr Gleb B Sukhorukov
Queen Mary, University of London*

- Nano-engineering colloidal particles and capsules.
- Microcapsules with multiple function.
- Applications in living systems and more.

10.40 - 11.00 Coffee Break

11.05 – 11.25 ‘Risks with Combustible Nanomaterials: Thermal and Explosive Characterization’ *Jacques Bouillard
INERIS, France*

- Review of basic principles of thermal and explosion safety of powders
- Size effects on safety parameters
- Illustration on nanopowders: Carbon black, nanotubes and metallic materials
- Conclusion: Impacts on Risk assessments

5. Regulatory Framework.

11.30 – 11.50 Session Keynote: ‘Making policy for the potential environmental risks associated with nanoscale materials’ *Michael Rose
DEFRA*

- Appropriate controls of the risks to the environment and human health posed by nanoscale materials.
- Uncertainty presents difficulties for developing policy and requires gathering of evidence.

11.55 – 12.15 ‘International standards developments relevant to nanoparticles’ *Dr Peter Hatto
Director of Research
IonBond Ltd*

- What needs standardizing and why.
- Existing standards and current standardization activities.
- Pre- and co-normative research to support future needs.

12.20 - 12.40 **'Environmental, Health and Safety Aspects of Nanotechnology - Implications for the R&D in (small) Companies'** *Steffi Friedrichs*
TTP

- How to assess the risks posed by nanoparticulate material.
- How to provide a safe working environment.
- How to account for toxicological tests and approval.

12.45 – 13.40 **Lunch**

13.45 – 14.05 **'Taking New Nanoparticle-based Products to the Market'** *Barry Park*
Oxonica
COO

- Key questions to be considered prior to taking nanoparticle based products to market.
- Oxonica response to these key questions.
- Conclusions from series of standard tests on the products taken to the market.

6. Nanoparticle Characterization:

14.10 -14.30 **Session Keynote: 'Nanoparticle Characterization'** *Dr Mark Gee*
NPL

- Characterization needs for manufacture.
- Characterization for health and safety.
- Characterization methods and need for standards.

7. Nanoparticle Synthesis and Stabilization

14.35 -14.55 **Session Keynote: 'NanoParticles and their Stabilization'** *Prof Brian Vincent*
Bristol University

- Charge versus steric stabilisation of particles: their relative merits.
- Colloidal gases, liquids, crystals, glasses and gels: a brief introduction to these states.

15.00 – 15.20 **Tea Break**

15.25 – 15.45 **'Stable gold particles for life science and other applications'** *Jim Carney*
Technical Director
British Biocell International

- Essential properties of gold nanoparticles for use in medical diagnostic tests.
- How gold nanoparticles work in rapid diagnostic tests.

15.50 – 16.10 **'Aqueous Synthesis of Inorganic Nanoparticles'** *Richard Buscall*
MSACT Consulting

- Inorganic nanoparticles can be synthesised in both aqueous and non- aqueous.
- Aqueous synthesis can be preferred for a variety of reasons.
- Stabilization is an issue though - facile in non-aqueous media, but not in aqueous.

16.15 – 16.35 **'Industrial converting of nanoparticles in real-world products - unfolding the innovation potential'** *Samuel Schaer*
Managing Director
Buhler PARTEC

- Presentation of industrial converting technology to incorporate nanoparticle enabled functionality into liquid and solid product formulations.
- Focus on tailored surface chemistry of nanoparticles to ensure compatibility with end product formulation and unfolding of functionality in those products.
- Importance to consider mutual influence of end product formulation vs. intermediate dispersion vs. characteristics of raw nanoparticle material in integrated commercialization efforts: Trade-offs ahead!

16.40 - 16.45 **Final Remarks, Conference Close**