

NIA
Nanotechnology Industries Association

BioCentre Symposium
House of Lords, London, 28th February 2011

*Revolution, Regulation & Responsibilities:
Technology & Democracy in the 21st Century*

Nanotechnology Industries Association (NIA)

... the *sector-independent*, responsible voice for the industrial nanotechnologies supply chains;

... it *proactively* supports the ongoing innovation and commercialisation of the next generation of technologies and promotes their safe and reliable advancement.

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Nanotechnologies - the Story of Supply Chains Revolution

Manufacture of (Nanomaterials &) nanoenabled Products Trade & Manufacture of intermediate nanoenabled Products Retail of nanoenabled Products

Instrumentation & Services: Characterisation, Analysis, Detection

Associated Support Services (Insurance, Legal Representation, etc.)

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Nanotechnologies - enabling Technologies Revolution

Electronics / MEMS / Optoel Devices Energy / Environmental Technologies Materials / Life Sciences

Global research & development output 1985-2009

[S. Friedrichs & J. Schulte, Sci. Tech. Adv. Mater., ISNEPP 2006]

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Nanotechnology - Why now? Revolution

micro
nano
atomic

Solid State Physics
Miniaturization

Solid State Chemistry
Molecular complexity

Biology

1950 2000 2050

Invention of the Scanning Tunneling Electron Microscope

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Nanotechnology - Copying Nature for a sustainable Society ReEvolution

Fuel Light Electricity

Fuels Electricity

CO₂ Sugar H₂O O₂ H₂ H₂O

Photosynthesis Semiconductor/Liquid Junctions Photovoltaics

[© 2008, Elizabeth Mayo, SunRain Productions]

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Nanotechnologies – not just for the sake of it! ReEvolution

No technology-push,
... but a market-pulled demand for sustainability (external & internal):

- **Safety** (an analytical breakthrough)
- **Environment, Energy, and Climate**
- Meeting global market needs through science and innovation
 - Agriculture & Food
 - Building & Construction
 - Communications
 - Transportation
- Reducing Resource- & Emission Footprint
 - Greenhouse Gas Emissions
 - Water Conservation
 - Resource Conservation
 - Fleet Fuel Efficiency




2015 Sustainability Goals

Environmental Categories

Environmental Impact over the entire life cycle

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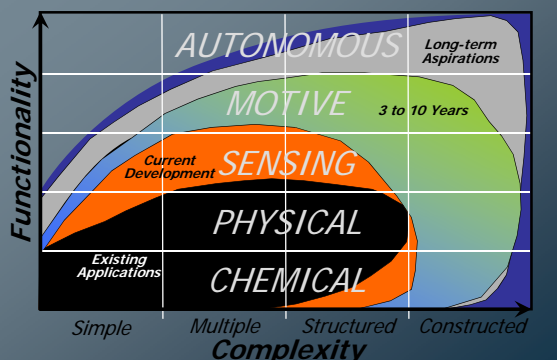
Communication – A Stakeholder Responsibility Regulation?



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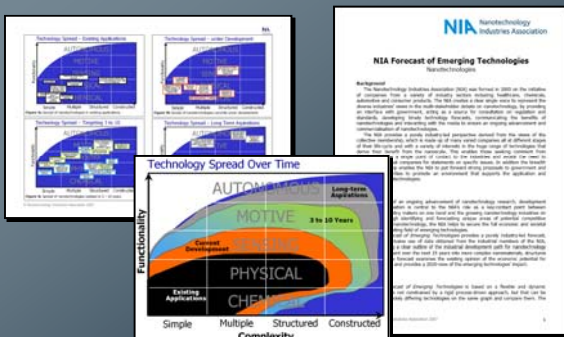
NIA Forecast – Technology Spread over Time Regulation?



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NIA Forecast of Emerging Technologies

free download: www.nanotechia.org/content/activities2/techforesight/



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Communication – A Stakeholder Responsibility Responsibilities



US environmental NGO backs nanoparticles in sunscreens

Released on Thursday 31st July 2008

In its latest scientific assessment of nearly 1000 name-brand sunscreen, researchers Environmental Working Group (EWG), a US-based NGO, conclude "that zinc and titanium-based formulations are among the safest, most effective sunscreens on the market based on available evidence."

The study, summarised under the title "Sunscreens: What Works and What's Safe", also looked at many sunscreen formulations containing "micronized and nano-sized zinc oxide and titanium oxide particles", and found that "formulations with zinc sunscreens without zinc and titanium oxide nanoparticles received the highest scores and greater numbers of 'A' and 'B' ratings than those without nanoparticles."

The study also found that "nanoparticles are not as safe as the larger particles of zinc oxide and titanium oxide, and that they are more likely to cause skin irritation, premature aging, wrinkling, and UV-induced immune system damage – than consumers using zinc- and titanium-based products."

Sunscreens without zinc or titanium contain an average of 4 times as many high hazard ingredients known or strongly suspected to cause cancer or birth defects, as do zinc and titanium sunscreens.

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Fullerenes(C60)	Japan, US		Denmark, China
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MWCNTs	Japan, US	Korea, BIAC (NIA), EC7	Germany, Canada, France, China, EC, BIAC(NIA)
Nano-Silver	US, Korea	Germany, Canada, Australia, Nordic Council of Ministers	BIAC (NIA), EC, France, China, Netherlands
Iron nanoparticles	China	BIAC	Canada, US, Nordic Council of Ministers
Titanium dioxide	France, Germany	Austria, Canada, Spain, BIAC, Korea, US, EC	China, Denmark, Japan, UK, BIAC(NIA)
Aluminium oxide			Germany, US, Japan
Carbon oxide	UK/BIAC(NIA), US/ERA	Australia, Spain	Denmark, Netherlands, Germany, EC, Switzerland, Japan
Zinc-oxide	UK/BIAC(NIA)	BIAC(CEFC), Australia, US(FDA), Spain	Denmark, Germany, Canada, Japan
Silicon dioxide	France, EC	Belgium, BIAC(CEFC), Korea	Denmark, Japan
Dendrimers		Spain, US	
	BIAC (NIA)	EC	US, Denmark, EC
Nano-Gold	South Africa	EC, BIAC, (NIA)	

NIA Projects:

PROSPEC Project:
Industrial contribution: £1840840
Government contribution: £1840767
Total: £3681607
Start date: 1st January 2009
Duration: 3 years (36 months)

Re/NanoCLAYM Project:
Industry contribution: £190 245000
Start date: 1st September 2010
Duration: 1 Year (provisional)

Global-NanoMaPPP:
current conf. contributions: EURO 4.5 Million
Start date: ASAP
Duration: 2 years

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NanoSafety – The Story of Supply Chains

Responsibilities

"Wherever this field leads, it is likely to follow the well-known pathway of **incredible results** leading to **unrealistic expectations** followed by **sobering complications** and **disappointments** - and ultimately, **cautious optimism**."



www.responsiblenanocode.org

[Drs Roger Laham and Peter Oeltgen, Harvard Medical School]

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NanoSafety – Stakeholder Responsibility

Revolution?
Regulation?
Responsibilities

High safety measures



Rubberized matting barriers

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Thank you!