

Sustaining growth in nanoproduction

NanoShow

29 January 2008

17.00 GMT, 09.00 SL Time



Sustaining growth in nanoproduction

Much has been said about the predicted spectacular growth in nanotechnological production in the coming years. In order to sustain such growth, a considerable investment in technological and manufacturing/business infrastructure is needed. Part of that infrastructure is quality-assured metrology and standardisation in nanotechnology. This talk will review national, European and international efforts, particularly addressing nomenclature, metrology, risks and product specifications and including prenormative R&D in nanotechnology.

With Prof. Leslie Pendrill, Head of Research, Measurement Technology, SP Technical Research Institute of Sweden



SecondLife 29 January 2008

Register: <http://nanoisland.wordpress.com/the-nanoshow/>
SLurl: <http://slurl.com/secondlife/Nanotechnology/219/145/23>

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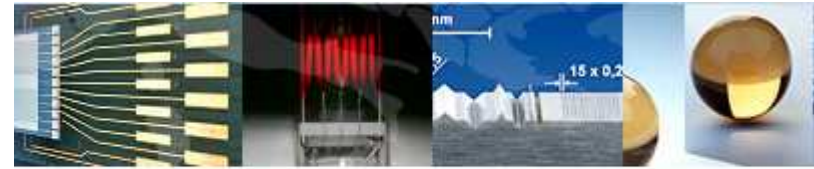
Sweden



EU



CEN/TC352 "Nanotechnologies"



EURAMET e.V.

Global



Bureau International des Poids et Mesures



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Nordic NanoTrade

POSITION PAPER



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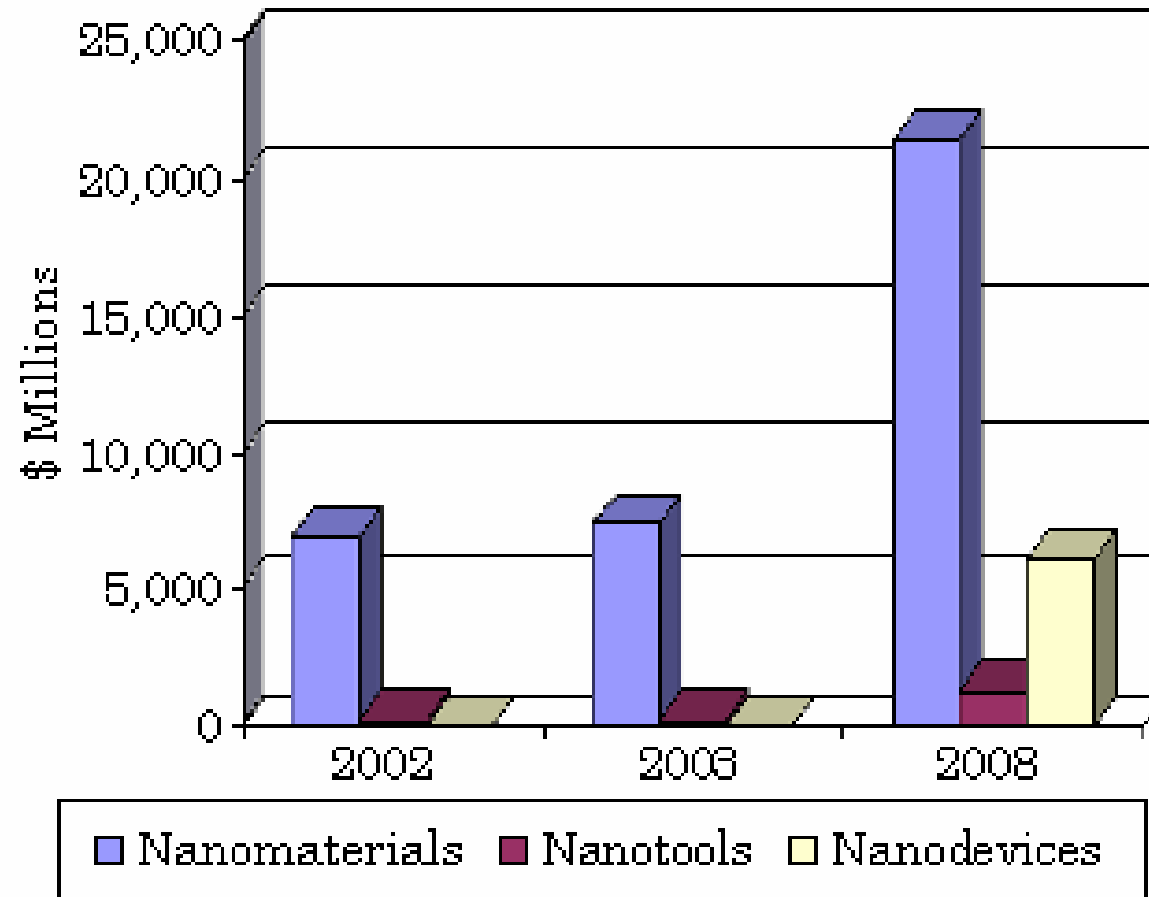
**Nordic pre-normative research
in relation to international development of
nanotechnology standards**

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Sustainable growth in nanoproduction?

Global Nanotechnology Market, 2002-2008
(\$ Millions)



Source: BCC, Inc.



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Nordic NanoTrade

- Much has been said about the predicted **spectacular growth** in nanotechnological production in the coming years.
- In order to sustain such growth, a considerable investment in technological and manufacturing/business **infrastructure** is needed.
- Potentially large **risk to (Nordic) industry** of unnecessary costs and duplicate work if one does not follow the international standardisation development

Unique opportunity

Proactive:

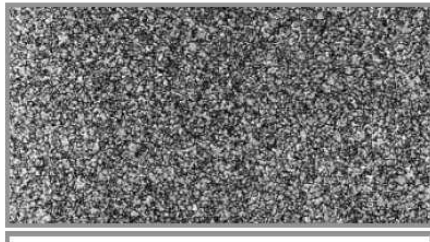
- standardisation development
- developing and introducing standardised characterisation methods in nanotechnology
- before national and regional positions become fixed.

Pre-normative R&D in nanotechnology



Nano-products

SANDVIK PN90 Nano-Series Cemented Carbide Grade for Printed Circuit Board Tooling



SANDVIK "Nano-Series" cemented carbide grades have been developed to meet the exacting demands placed on solid carbide tooling by modern technology.

SANDVIK "Nano-Series" cemented carbide grades have a tungsten carbide (WC) grain size of 0.2 µm. This grain size is achieved by means of a unique processing route quite different to conventional carbide technology.

These materials have been developed as a result of an extensive research programme aimed at optimising grade wear resistance, toughness and strength.

Pilkington Activ™ - Self-cleaning glass

Pilkington Activ™ - the world's first self-cleaning glass - is available now in the markets listed on the left.

Latest

Pilkington Activ™ Neutral

An attractive neutral coloured glass combining self cleaning and solar control properties.

[Click here](#)



RESISTS SPILLS

The waiter just spilled an iced latte in your lap, but you don't mind. You're wearing pants made with NANO-TEX™ spill-resistant fabric, so the coffee just beads up and rolls right off.

Now, this beats those conventional fabric treatments we've all seen before. That's because Nano-Tex builds spill resistance into the very fibers of the fabric, and this keeps the pants comfortable, soft, and breathable—just as they should be.

With NANO-TEX Fabric, you're looking good and feeling good. Complications roll away like water off a duck's back, and you're ready for whatever's next.




CHARACTERISTICS

- SPILL RESISTANCE**
allows spills to wipe off easily
- DURABILITY**
maximizes performance over time
- COMFORT**
retains natural softness for maximum comfort
- BREATHABILITY**
allows fabric to breathe naturally

OTHER NANO-TEX FABRICS

[self-cleaning glass](#)

COOLEST COMFORT

RESISTS STATIC

REPELS & RELEASES STAINS

Forbes Top Nano Products of 2005

[previous](#) | [slower](#) | [stop](#) | [faster](#) | [next](#) >

3. Tootsie Roll's Nanotech Nemesis - O'Lala Foods Choco'la Chewing Gum



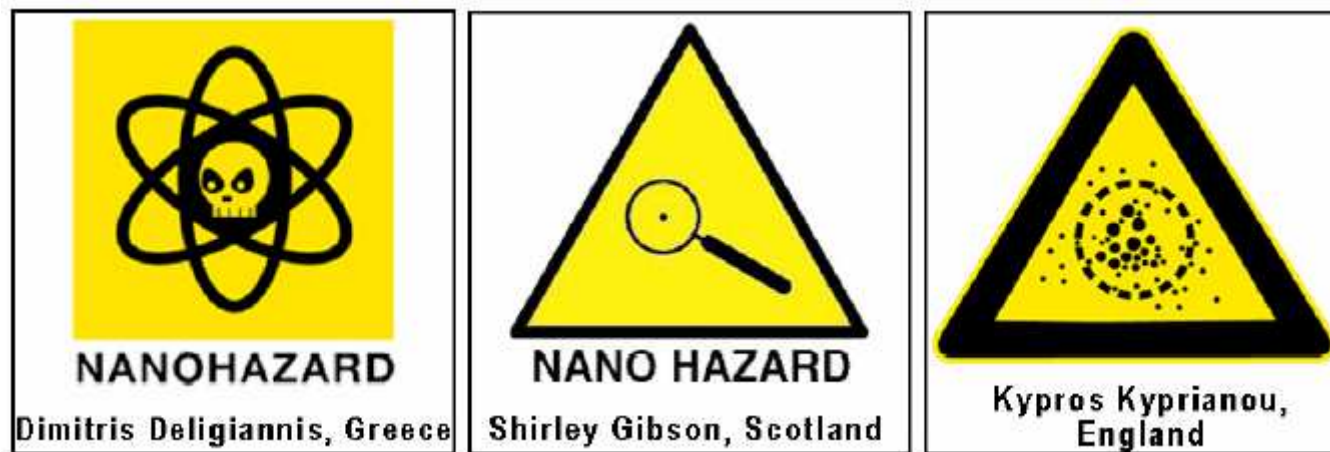
Cocoa butter has never been compatible with the polymers that give gum its elasticity. In fact, the fats found in chocolate will cause chewing gum to fall apart. Chicago-based O'Lala's solution is to incorporate nanoscale crystals, modifying surface morphology and giving its gum a creamier texture and chocolate flavor. Choco'la gum is commercially available in suburban supermarkets north of Chicago at specialty chocolate stores and on the company's Web site at [www.olalafoods.com](#). A pack of 12 pieces will cost you about \$1.25.



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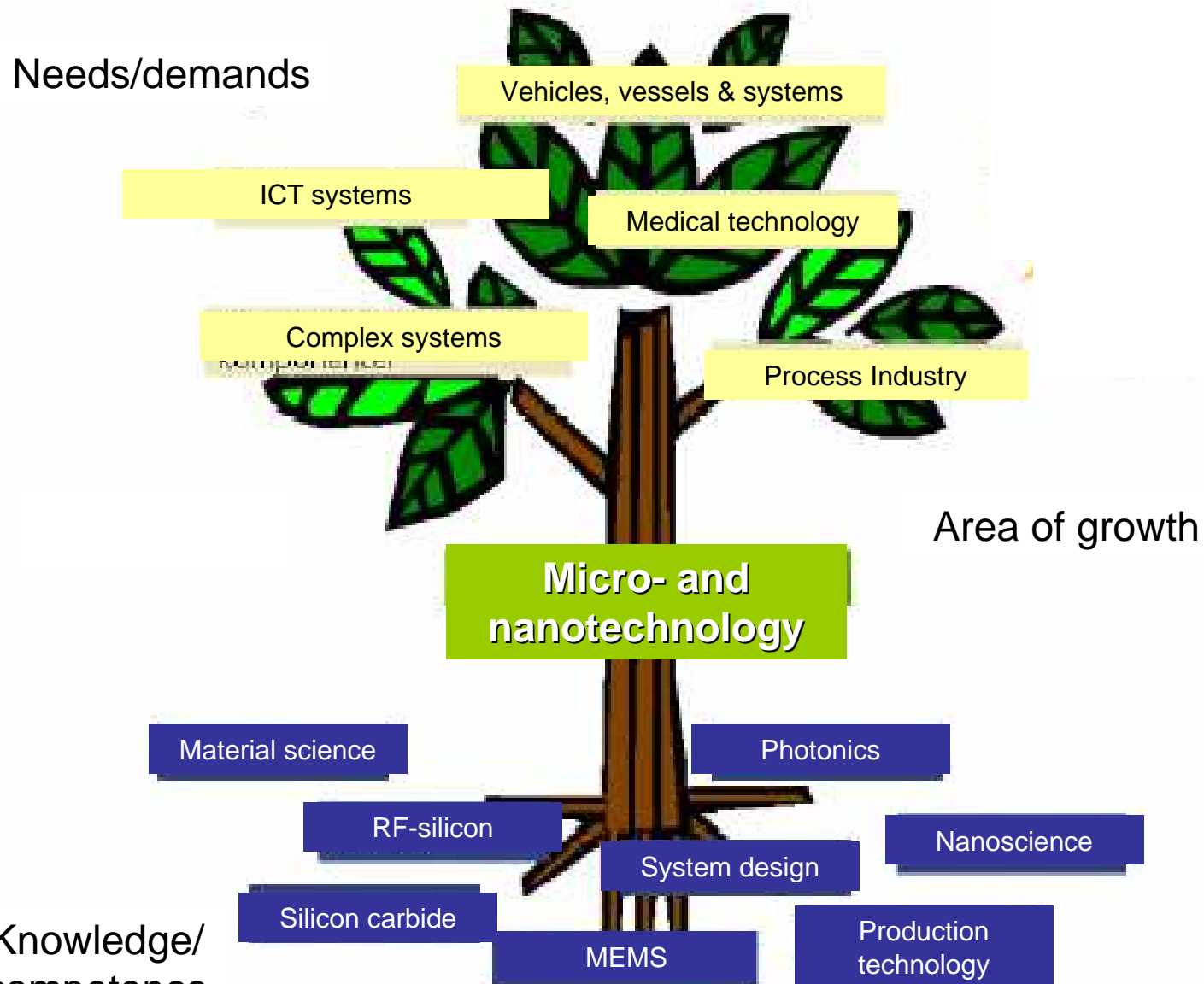
Nano-products

- Health, safety and environmental impact
- Product and process standards



http://www.etcgroup.org/en/materials/publications.html?pub_id=604

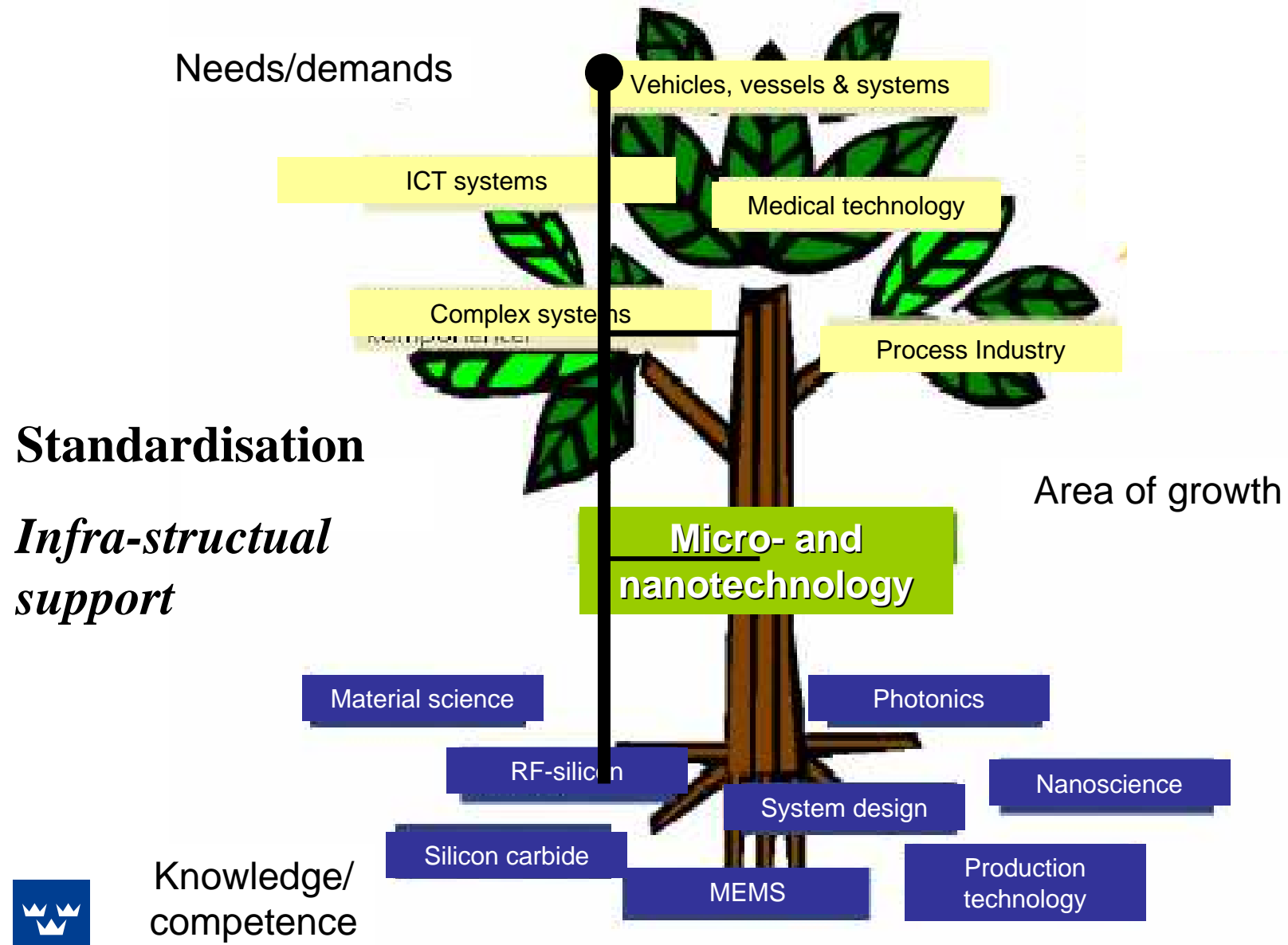
Sustaining growth in nanoproduction



Knowledge/
competence

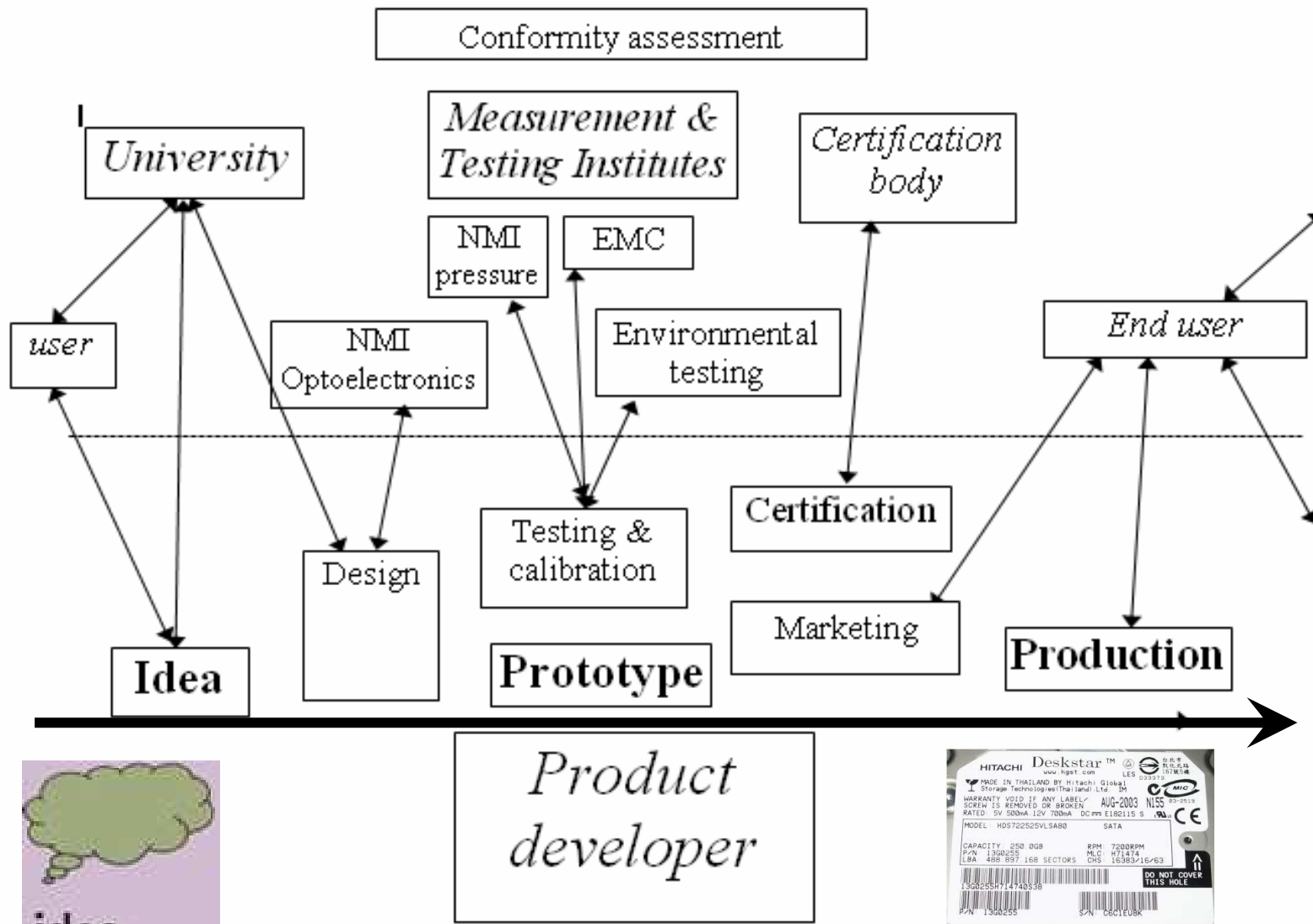
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Sustaining growth in nanoproduction



Current work-items in nanostandardisation



CEN/TC352 "Nanotechnologies"



- Terminology & nomenclature
- Measurement & characterisation of nanosystems
- Health, safety and environmental impact
- Product and process standards



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Current work-items in European (CEN) nanostandardisation

Home page > Sectors > Technical Committees and Workshops > [List of Technical Committees, Workshops and other bodies](#)

CEN/TC 352- Standards under development

Print

	Project reference	Title	Candidate Citation	Current status	DAV
00352001	prCEN ISO/TS 27687	Nanotechnologies - Terminology and definitions for nanoparticles (ISO/TS 27687:2007)	No	Under Approval	2008-05
00352002	prEN ISO 29701	Nanotechnologies - Endotoxin test on nanomaterial samples for in vitro test systems	No	Under Development	2010-05
00352003	prEN ISO 10801	Nanotechnologies - Generation of silver nanoparticles for inhalation toxicity testing	No	Under Development	2010-05
00352004	prEN ISO 10808	Nanotechnologies - Monitoring silver nanoparticles in inhalation exposure chambers for inhalation toxicity testing	No	Under Development	2010-05



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Nano Terminology & Nomenclature

What is nanotechnology?

Nanoscale: Size range 1 nm to 100 nm

Nanoscale feature:

Unique characteristics related to nanoscale size



Nano Terminology & Nomenclature

PUBLICLY AVAILABLE SPECIFICATION

PAS 71:2005

Vocabulary — Nanoparticles

3.17

nanofibre

nanoparticle with two dimensions at the nanoscale and an aspect ratio of greater than 3:1

NOTE Types of nanofibres include nanowhiskers, nanorods and nanowire.

[PAS 71 Steering Group]

3.18

nanohorn

nanoscale cone with a curved axis

[PAS 71 Steering Group]

3.19

nano-onion

nanoparticle composed of concentric molecular shell structures

NOTE Also referred to as a nested nanoparticle.

[PAS 71 Steering Group]

10.3

Auger Electron Spectroscopy (AES)

technique in which an electron spectrometer is used to measure the energy distribution of Auger electrons emitted from a surface

NOTE AES instruments can achieve lateral resolutions as low as 5 nm.

[BS ISO 18115, *Surface chemical analysis — Vocabulary*]

10.4

BET analysis

characterization technique based on the model developed by Brunauer, Emmet and Teller that allows the surface area of powders to be determined by gas adsorption

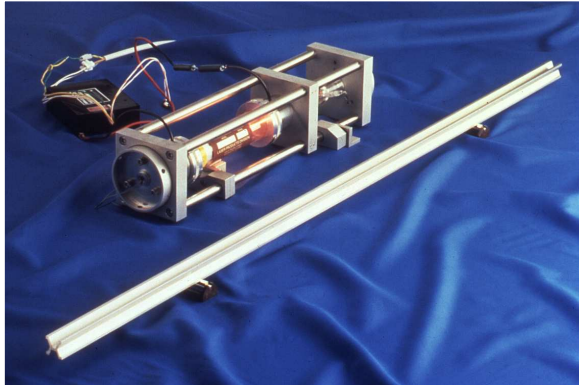
NOTE Typically nitrogen or carbon dioxide is used but gases such as krypton or argon may be used for low surface area materials because of their greater sensitivity (mass gain per unit area).

[PAS 71 Steering Group]

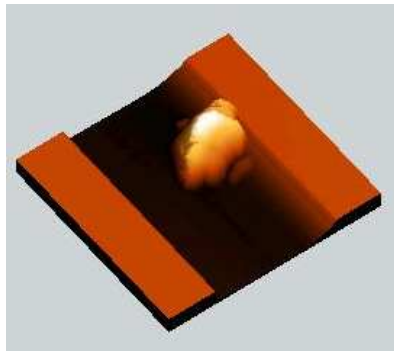
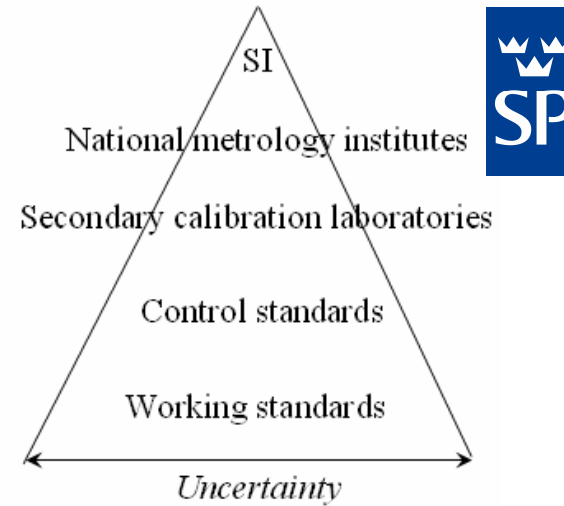


SP Technical Research

Quality-assured nanomeasurement & characterisation



1 metre



100
nanometres

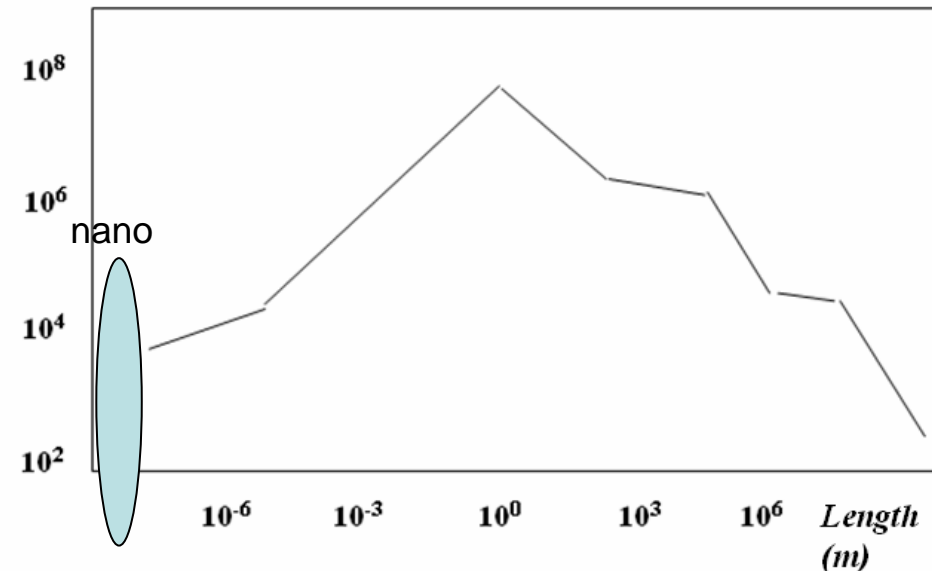
- Traceability
- Uncertainty

- Interoperability
- Communication



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Accuracy



Quality-assured nanomeasurement & characterisation



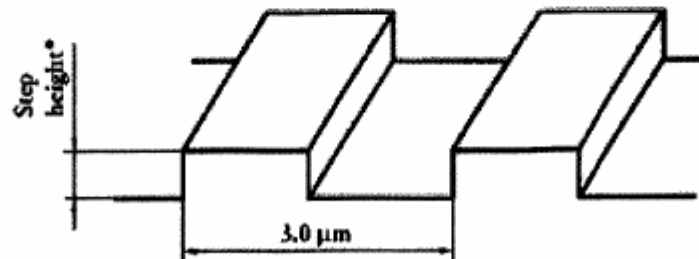
Set of Calibration Gratings

Product specification

DME 2356



TGZ01, TGZ02, TGZ03



Step height:

TGZ01: 20 ± 0.5 nm

TGZ02: 100 ± 1.5 nm

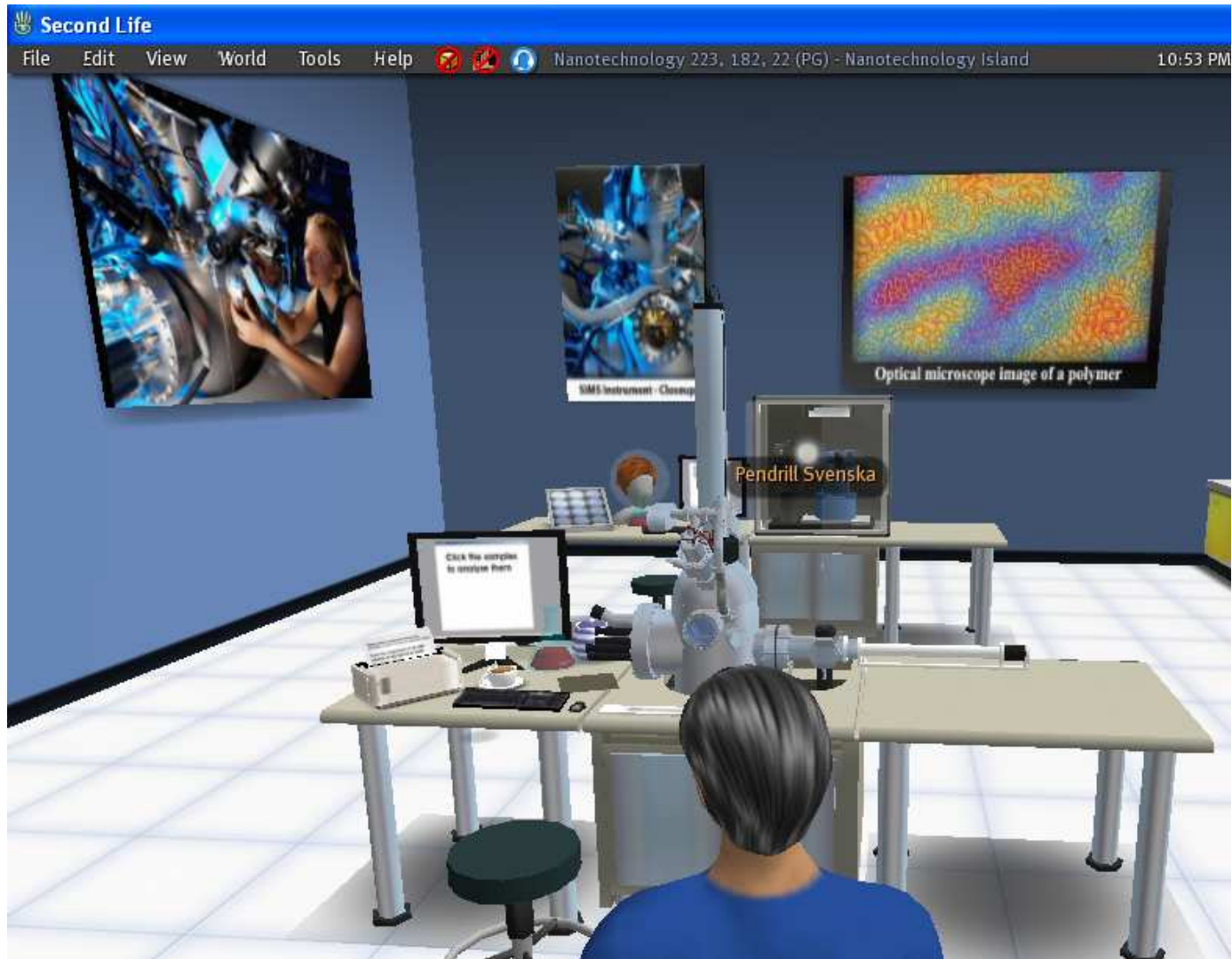
TGZ03: 500 ± 1.5 nm

Pitch: 3.0 µm

Active area: 3×3 mm



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<http://slurl.com/secondlife/Nanotechnology/210/213/308>

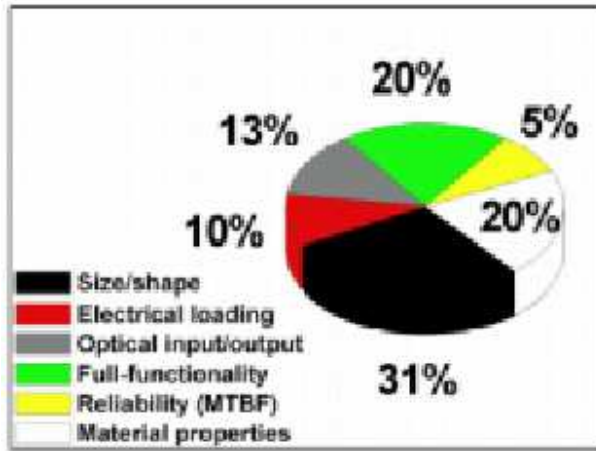
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Guide to nano-measurement

Nanocharacterisation



<http://www.memstand.org>

Nanometrology

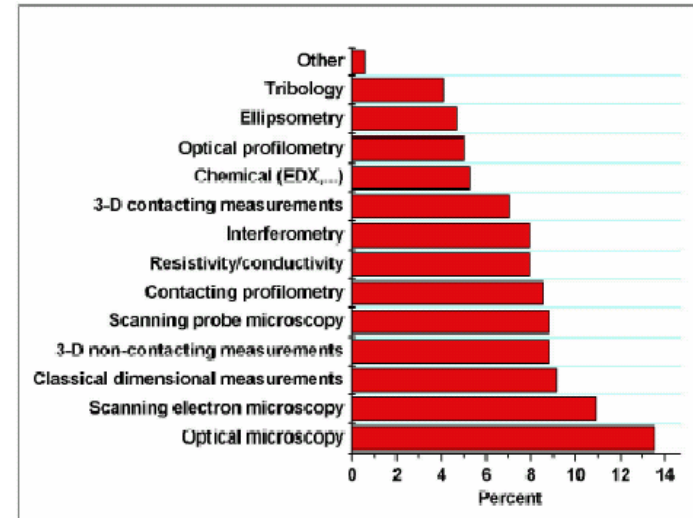
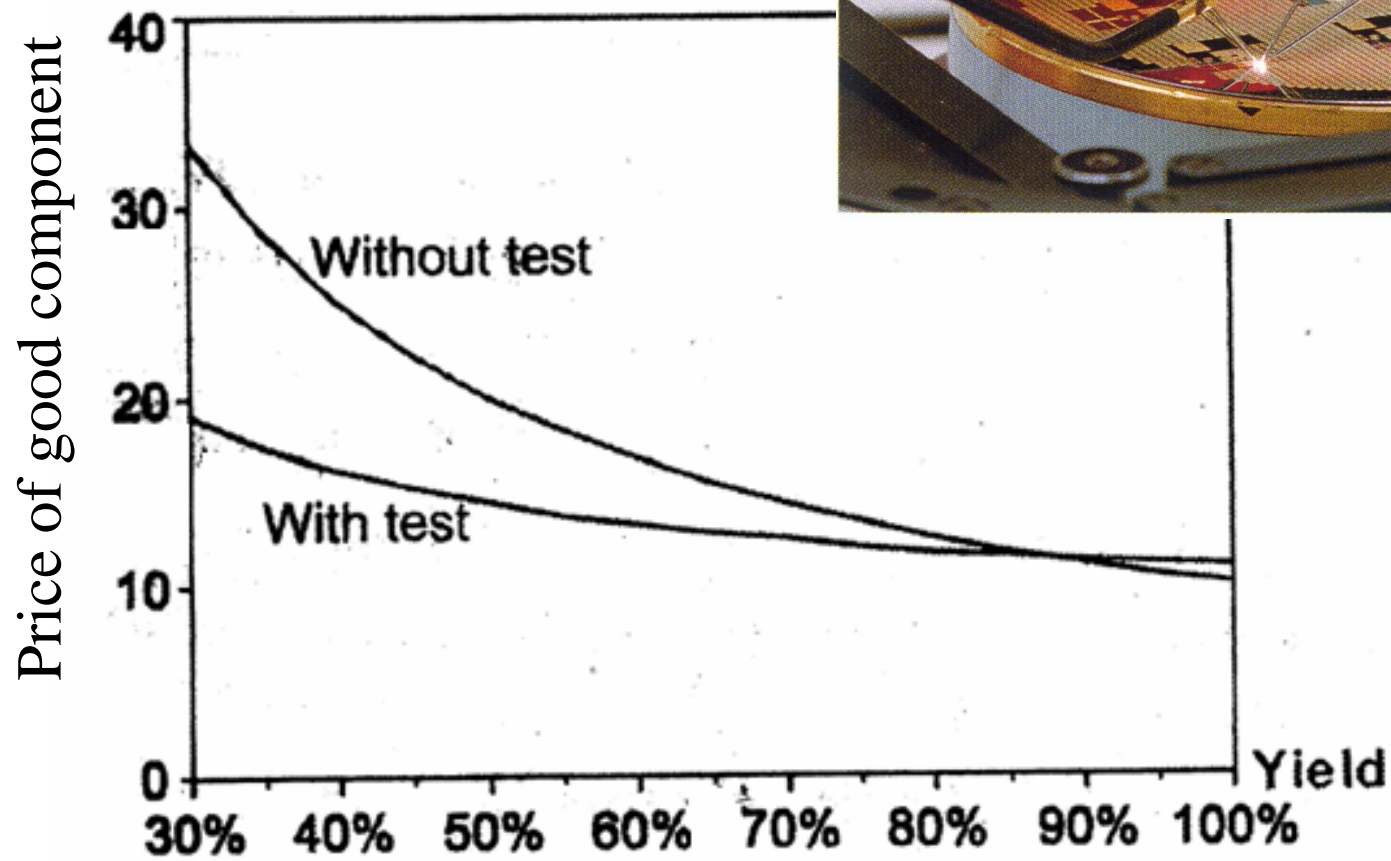
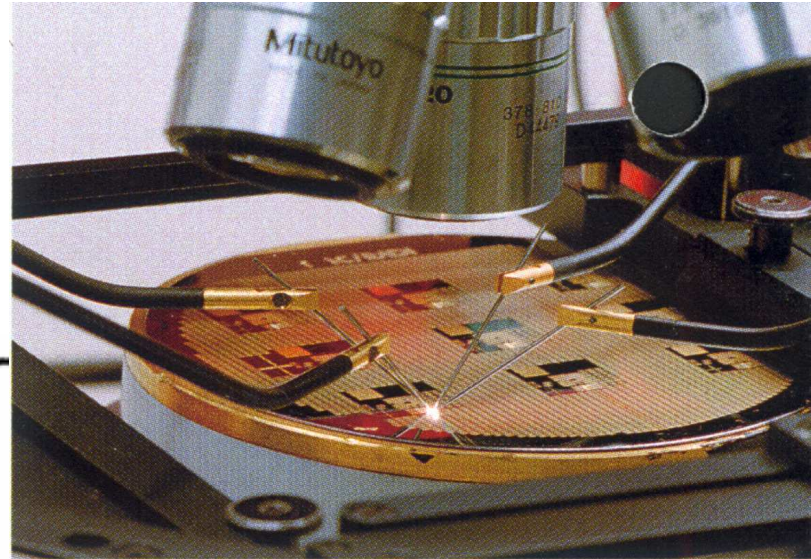


Table 1 Matrix of nanotechnological objects and metrological methods

	<i>Metrology</i>	mass	optics	electricity	pH
<i>Object</i>					
Np/Nt/Nf-physical properties		x	X	x	x
Nscoatsfilm for sensors/actuators/electronics		x	x	X	X
etc					



Quality-assured nanomeasurement & characterisation



Health, safety & environmental aspects of nanotechnology

A scoping study to identify hazard data needs for addressing the risks presented by nanoparticles and nanotubes

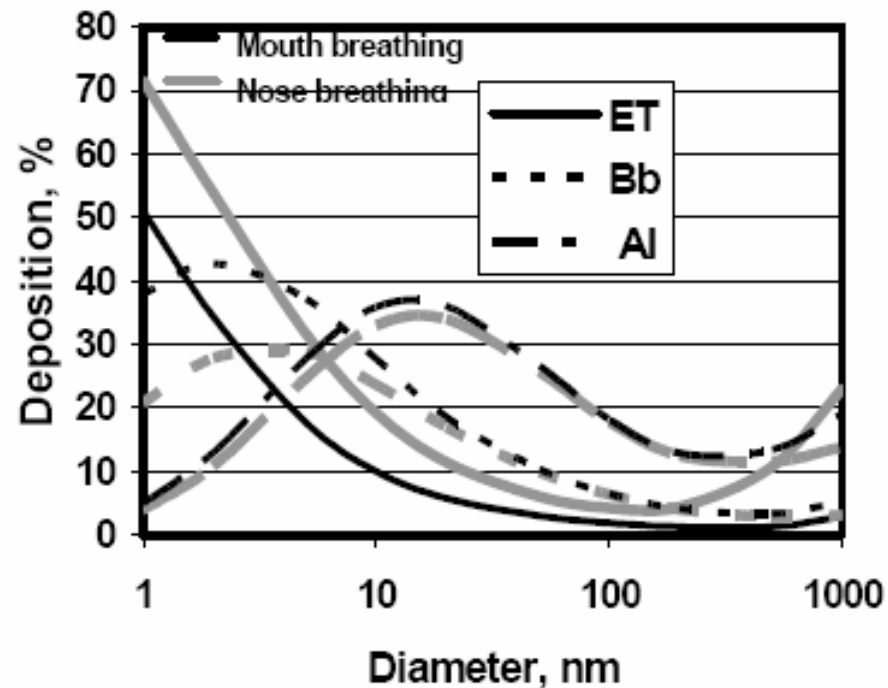


Figure 2.1 Regional deposition of inhaled particles with diameters between 1nm and 1000nm for nose and mouth breathing in the extrathoracic airways (ET) bronchial airways (Bb) and alveolar region (Al) during breathing at rest as predicted by ICRP (Yeh *et al*, 1996).



Product and process standards in nanotechnology

EU

Help ensure correct and consistent description of nano-products.

Guidance on:

- understanding the material properties that contribute to (nano)product performance
- selection of appropriate measurements and controls for use in specifying and controlling manufacturing processes,
- guidance on impacts of contamination and guidance on packaging and transportation to ensure preservation of performance.

Guide will:

- reduce prices
- expand market
- increase customer confidence through assured product consistency
- impact safety
- confirm that nano-products meet minimum recommendations

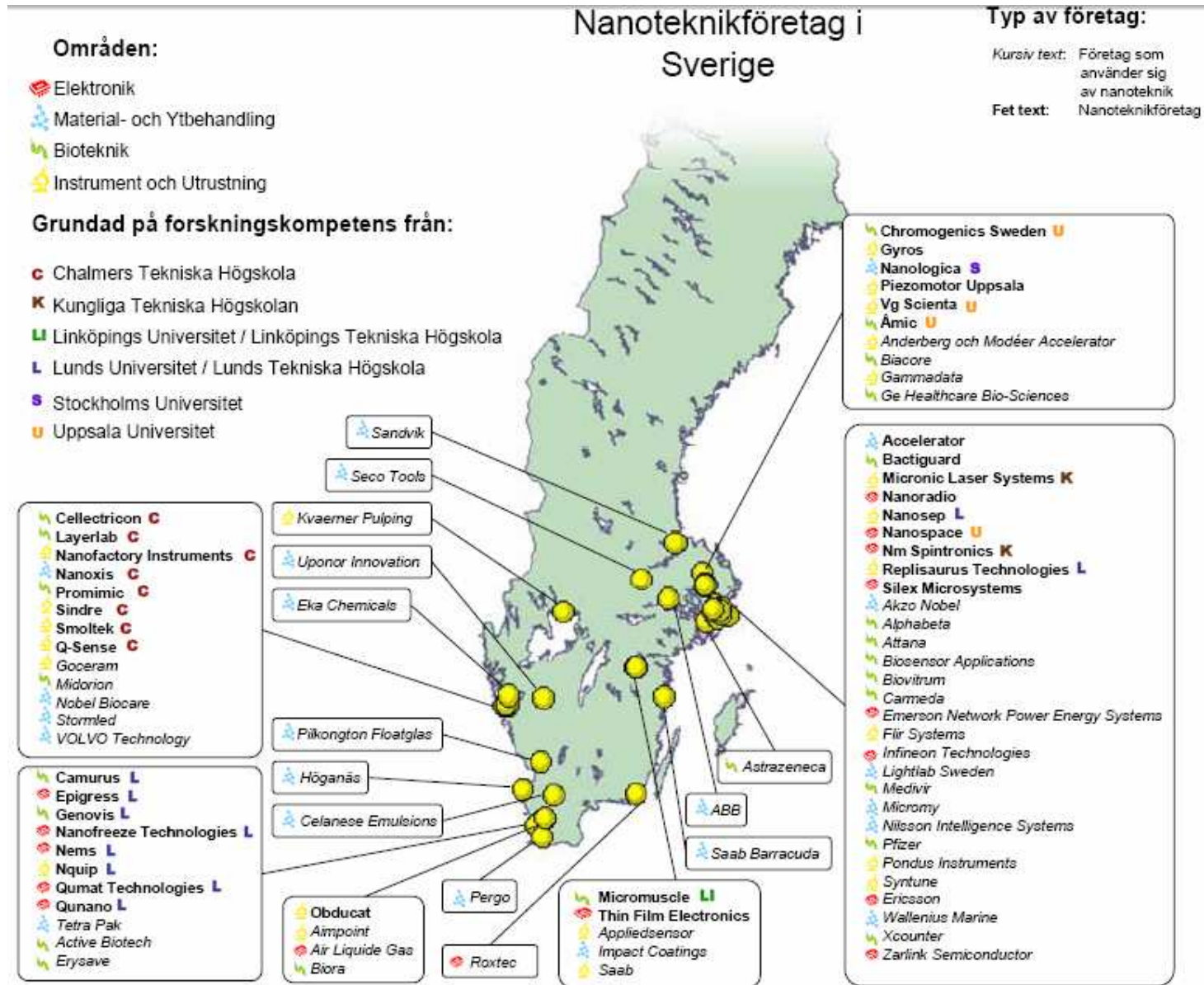


<http://www.techwarelabs.com/reviews/storage/hitachi250sata/>



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Nanotechnological companies in Sweden



Outreach in nanotechnology – Swedish nano-standardisation



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Utvecklingsprojekt

- Digital samverkan
- eFörvaltning
- Energimärkning av tappvattenarmaturer
- Försvarsstandard
- Humanitär minröjning
- Solid biofuels - ISO

Nanoteknik

- Artikel - Var med från start
- Viktigt just nu
- Varför standardisera?
- Varför delta?
- Internationellt arbete
- Kontakt...



Påverka internationella standarder för nanoteknik

Nanoteknik förväntas i framtiden kunna tillämpas inom en mängd olika områden som t.ex. hälsa, tillverkning, materialutveckling och inom kunskapsintensiva teknologier. Utvecklingen inom nanoteknikområdet går snabbt. För att ge stöd till denna utveckling och tillväxt och möjliggöra en effektiv och tydlig kommunikation mellan industri, forskare och myndigheter har det påbörjats global och europeisk standardisering för nanoteknik.



Outreach in nanotechnology - Swedish Micro- and Nanotechnology SME network



EXPERTKOMPETENS
MIKRO/NANO SYSTEMTEKNIK



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Nyhetsbrev december 2007

Sammanfattning av nyhetsbrevet - längre versioner av texterna följer nedan

Senaste artiklarna inom mikro/nano systemteknik

Ett framgångsår för arbetet med samverkan mellan företag och akademi

Kommande arrangemang >

2008-02-12
minST hos Eskilstuna Tekniska klubb

2008-05-06
Micro Systems Technology 2008

minST >



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European Collaboration in Measurement Standards

EURAMET: European Collaboration in Measurement Standards: Homepage - Mozilla Firefox

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http://www.euramet.eu/

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EURAMET

European Association of National Metrology Institutes

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EURAMET e.V.

The **European Association of National Metrology Institutes** (EURAMET) is a Regional Metrology Organisation (RMO) of Europe.

It coordinates the cooperation of National Metrology Institutes (NMI) of Europe in fields like research in metrology, traceability of measurements to the SI units, international recognition of national measurement standards and of the Calibration and Measurement Capabilities (CMC) of its members. Among these tasks, EURAMET is responsible for the elaboration and execution of a European Metrology Research Programme (EMRP).

EURAMET e.V. is a registered association of public utility under German law.

Since 1 July 2007 EURAMET e.V. is the successor of EUROMET.

EURAMET in Short: Brief information on organisation and contacts.

European metrology was coordinated successfully over almost 20 years by EUROMET,

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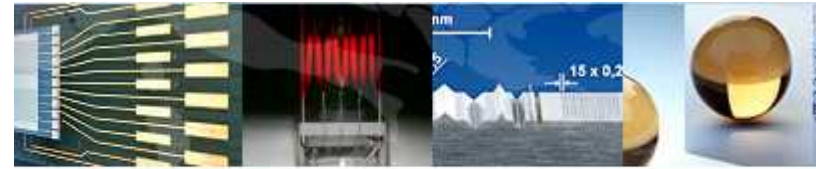
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