

BAuA workshop on safe handling of nanomaterials at workplaces

27-28 November 2012

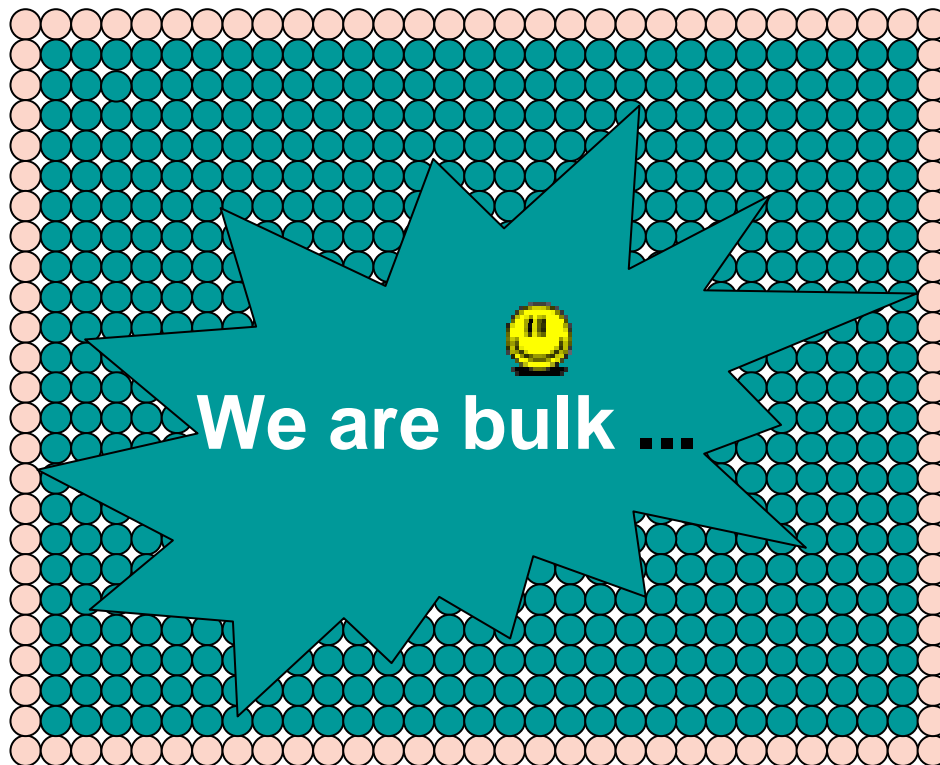
Briefing on the occupational safety starting point regarding handling of nanomaterials

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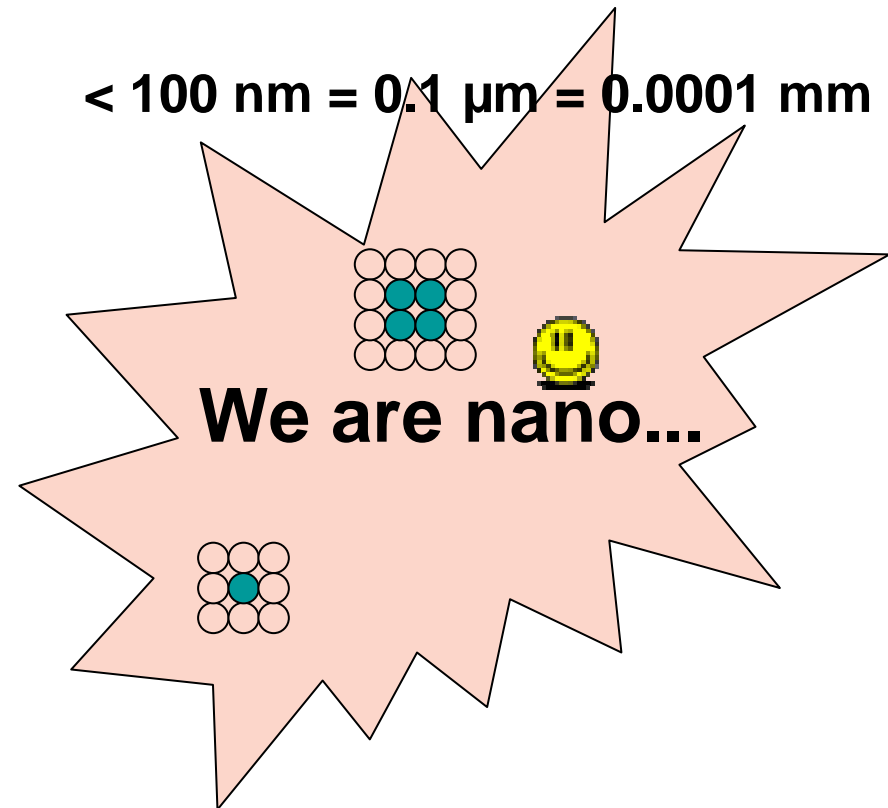


Nanomaterials: the surface makes the difference

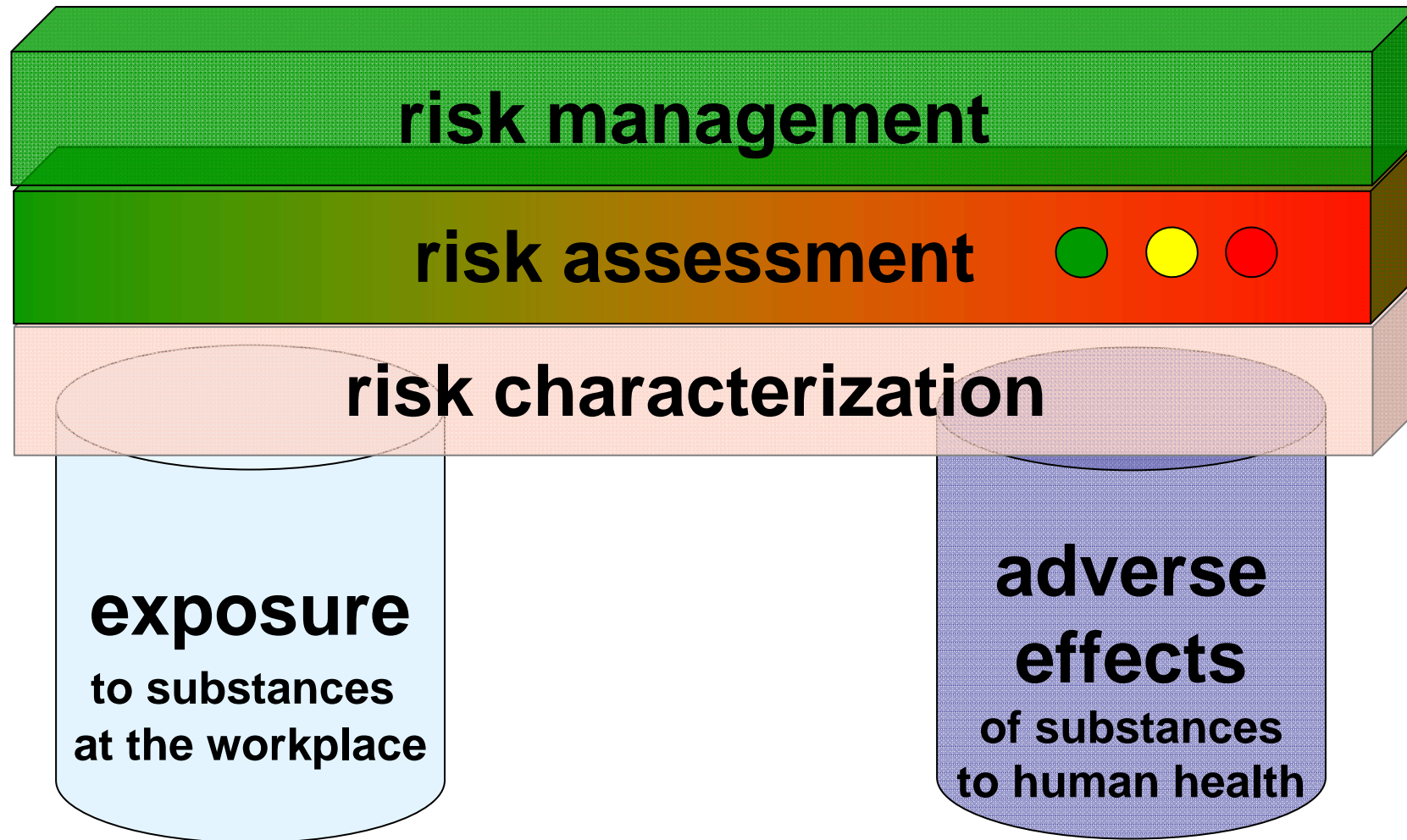


... with its specific physical and chemical properties

$< 100 \text{ nm} = 0.1 \text{ } \mu\text{m} = 0.0001 \text{ mm}$



... with its modified physical and chemical properties

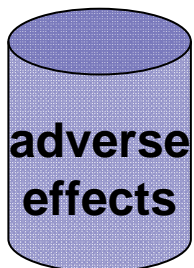


Nanomaterials are chemical substances / agents ...

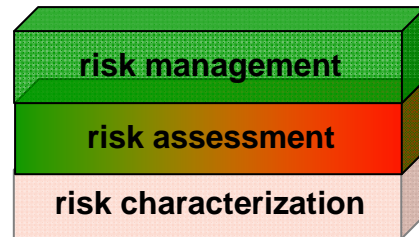
... and in R&D we've seen a lot of things, that also hold true for many other chemical substances and mixtures:



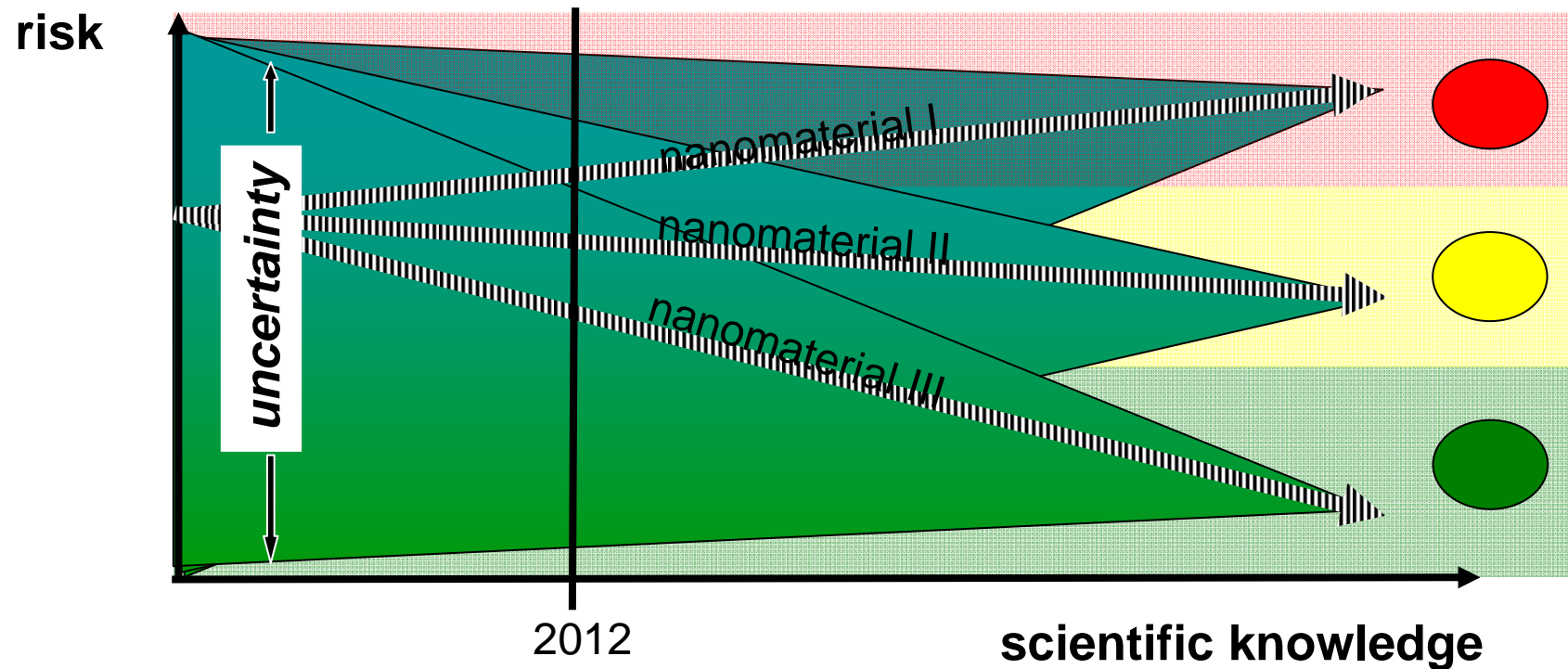
- traditional **measurement techniques** are applicable
- REM allows **morphological characterization**
- identifying **background exposure** is essential
- high **dominance of aggregates and agglomerates**
- **no significant exposure levels** at selected workplaces

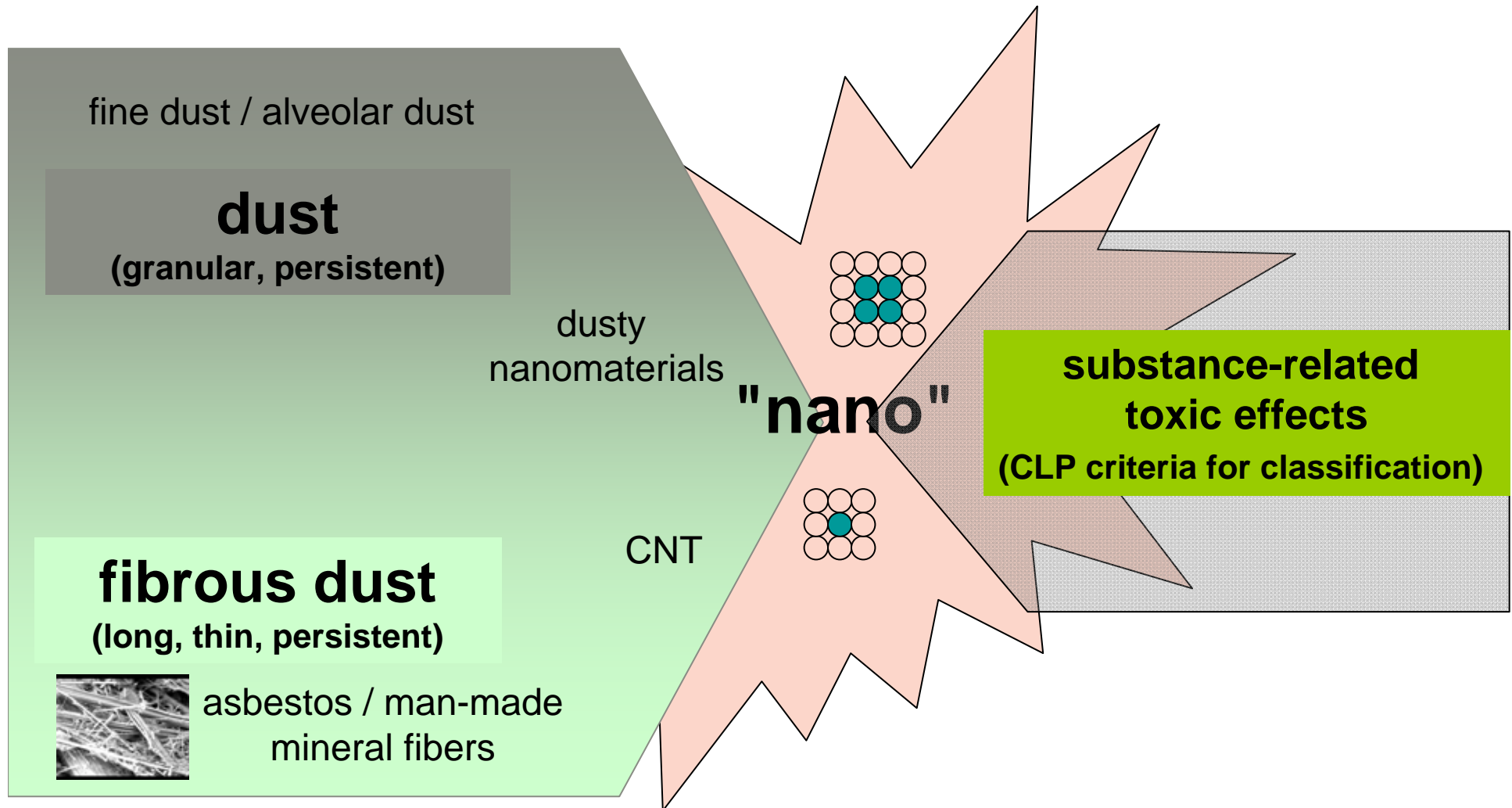


- **no new effects** observed directly related to "nano" properties
- **no relevant desagglomeration** of inhaled NM in the lung
- **small difference in potency** between "micro" and "nano" form of the same substance (e.g. TiO_2)



- **limited relevance of *in-vitro*** results for regulation
- "traditional" **control strategies for dust are efficient** for NM
- **measurements possible, but complex and expensive**

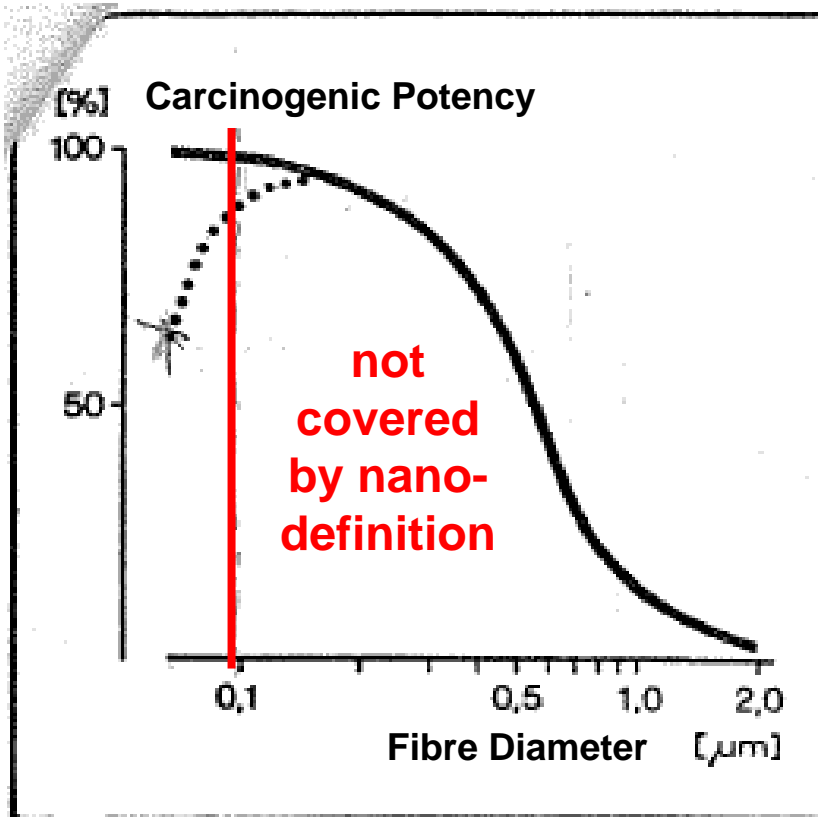




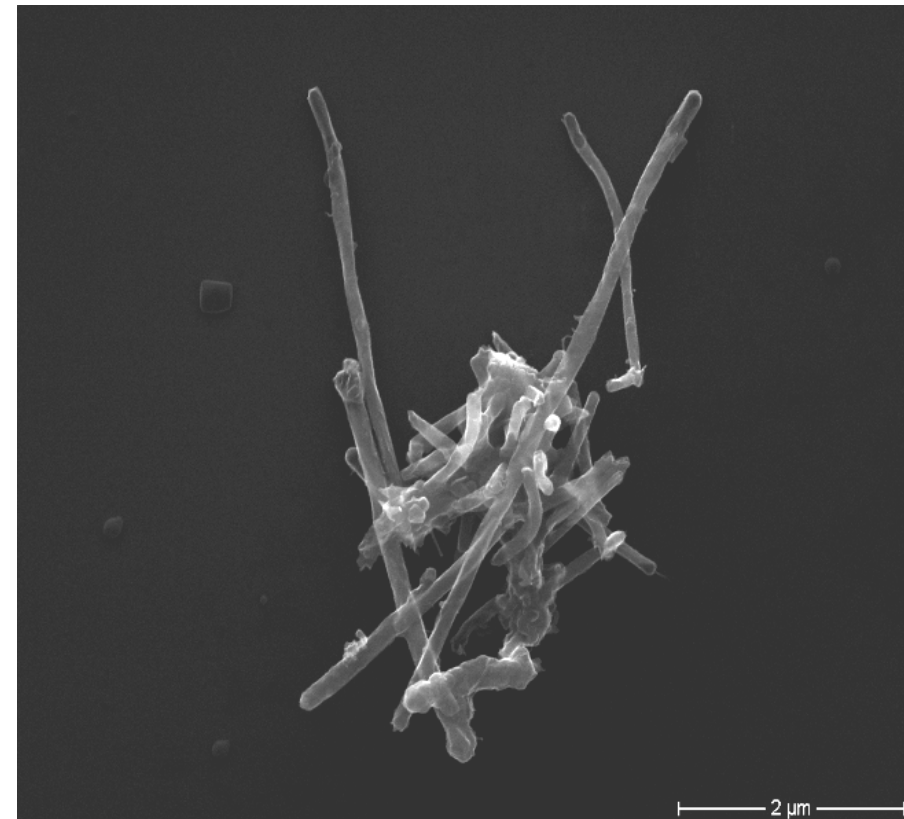
Ideas for grouping of nanomaterials

- 1. nanomaterials from substances with a known specific toxicity**
e.g. cadmium, nickel, cobalt, cristalline silica
- 2. fibrous nanomaterials**
e.g. carbon nanotubes (CNT), carbon nanofibres (CNF)
- 3. nanomaterials with respirable, granular biopersistent particles without known significant specific toxicity (GBP)**
e.g. carbon black, titanium dioxide, alumina, zirconium oxide
- 4. soluble nanomaterials without a known specific toxicity**
e.g. amorphous silica

How do we implement a nano-definition ?

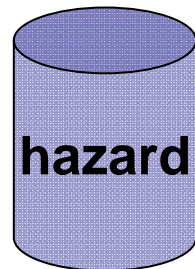


from: Pott, F - ASP 8/77



baua/nanolab

Problems in risk assessment



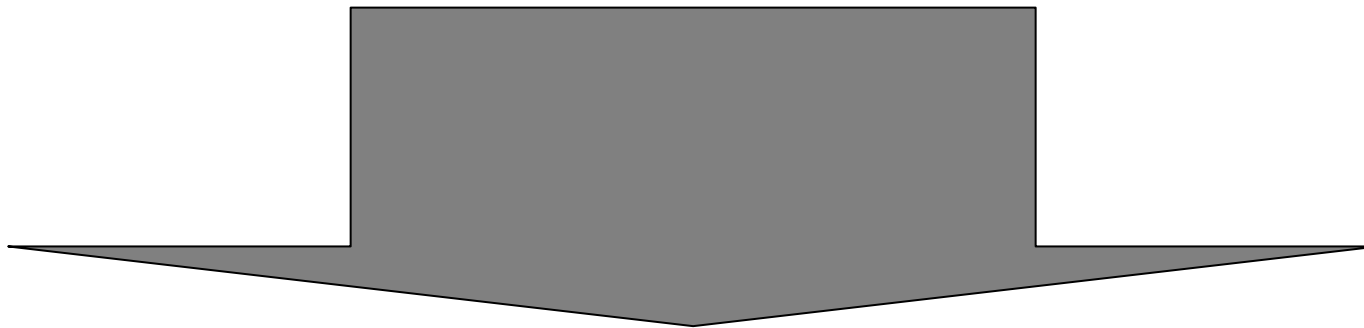
- only limited information from SDS, lack of information about
- **dustiness** of the material
 - **morphological characteristics** of released dust (alveolar, fibres)
 - **biopersistence** of released particles / fibres
 -



- only limited information from workplace measurements due to
- **background exposure** from machines, welding, cars,
 - **short-term activities** with nanomaterials
 - **lack of OEL** or reference values
 -

A special form of Control Banding

**Anticipated risk assessment
based on expert judgement**



**Standardized working procedures
(for specific tasks or branches)**

Impact of a regulation / recommendation
for protection of workers from (chemical) risks

"guarantor position"

Are controls feasible and
manageable?
Can effectiveness be monitored?

"performance"

Can it be presumed,
that controls are used in reality?

"compliance"

Terms of reference for a "nano-guideline" (I)

- from the current WHO discussion -

- **precise specification of application area** and related tasks/workplaces
- **validation in field studies** and/or transdisciplinary studies
- **quality assessment and management, SOP** in the reported studies
- **scientific background** (hazard data, exposure data, efficacy of controls)
- **accurate physicochemical characterisation** of nanomaterial
- **potential for bias** of the author / institution
- **practical experience** of the author / institution in OSH

Terms of reference for a "nano-guideline" (II)

- from the current WHO discussion -

- **regulatory background**, consideration of the **STOP-principle** for OSH,
- **user-friendliness** for target group(s)
- **clear allocation of responsibilities**
- **involvement of stakeholders / social partners;**
- **inclusion risk-related tiered solutions**
- **demonstration of alternative approaches** for risk mitigation
- **transparent specification on the precautionary approach**