Characterization
-
eNANOMAPPER
Knowledge Infrastructure and Framework Meeting

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DET NATIONALE
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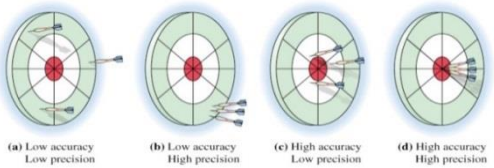
We all agree! Good physicochemical data are needed in nanosafety research?



- **Know what you test!**
  - Verify or generate the PC data needed to understand the test material
- **Proper PC data will/may form the foundation for grouping/read-across and hazard model development**
  - Reliable links between the NM properties and their (mechanism of) toxicological effects (e.g., empirical, ADME or QSAR-like models)
- **Understand the exposure characteristics**
  - Needed to interpret the toxicological test results (e.g. role of stability)
  - Reliable links between the NM properties and their (mechanism of) toxicological effects (e.g., empirical, ADME or QSAR-like models)

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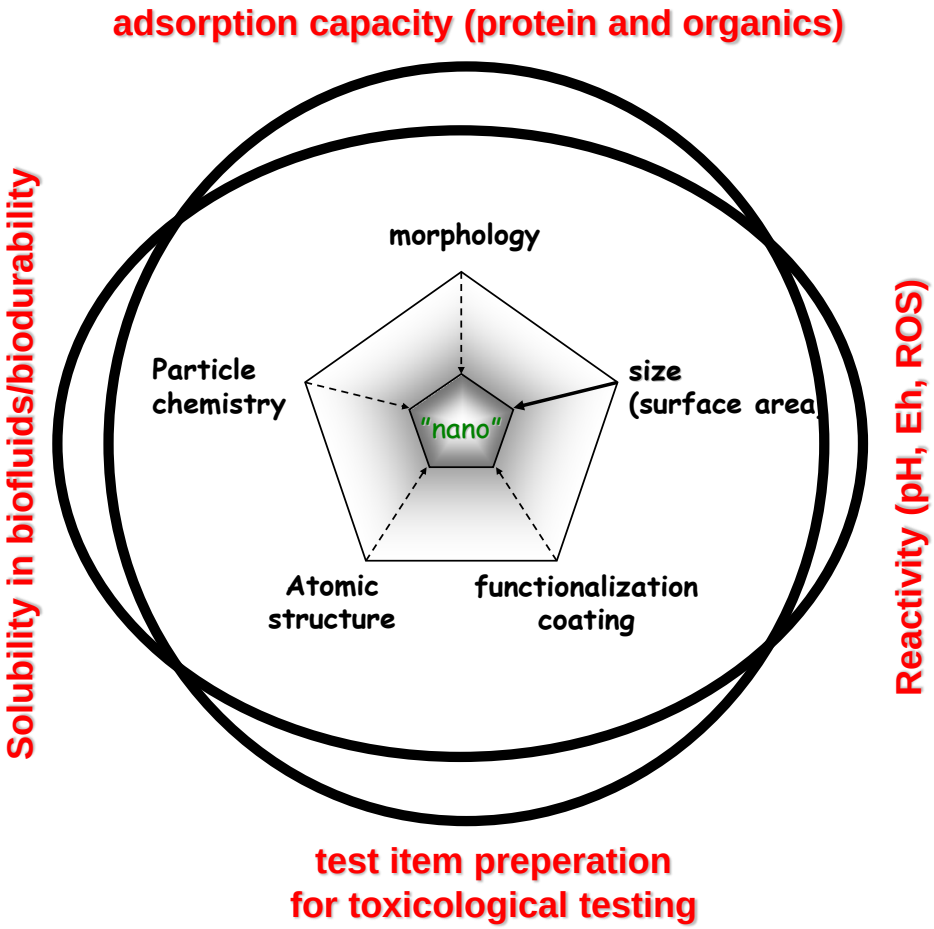
Characterization data demands in nanosafety research



OECD list of end-points

- Molecular structure/crystalline phase
- Composition/purity
- Surface chemistry (coating/functionalization)
- Size (primary/aggregate/agglomerate)
- Crystllite size
- Morphology (nano-object)
- Specific surface area (and relative density)
- Porosity
- Zeta-potential
- (Photo-)catalytic activity
- Redox potential
- Radical formation capacity
- Water-solubility/dispersability
- Octanol-water coefficient
- Pour density
- Dustiness
- Other when relevant

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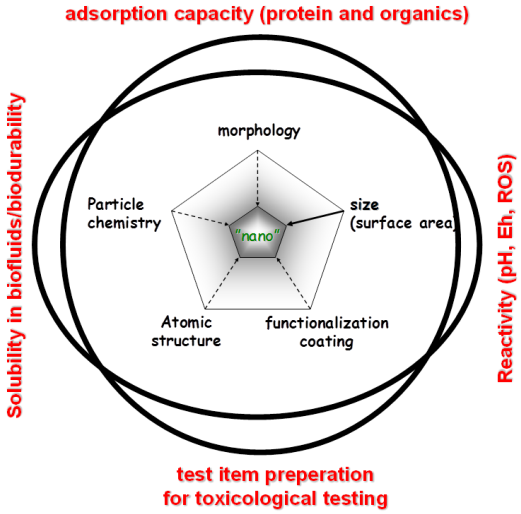
OECD ENV/JM/MONO(2010)46

Some issues observed?

- **Ontology?**
  - We need a common understanding of an end-point!
- **Consenus on methods to use?**
  - We rarely have it now!
- **Comparability between different laboratories?**
  - We rarely have it now!
- **Harmonized protocols and method validation?**
  - Yes, it is essential – Is certification needed?
- **Use of PC data!**
  - We need to understand which end-points are useful



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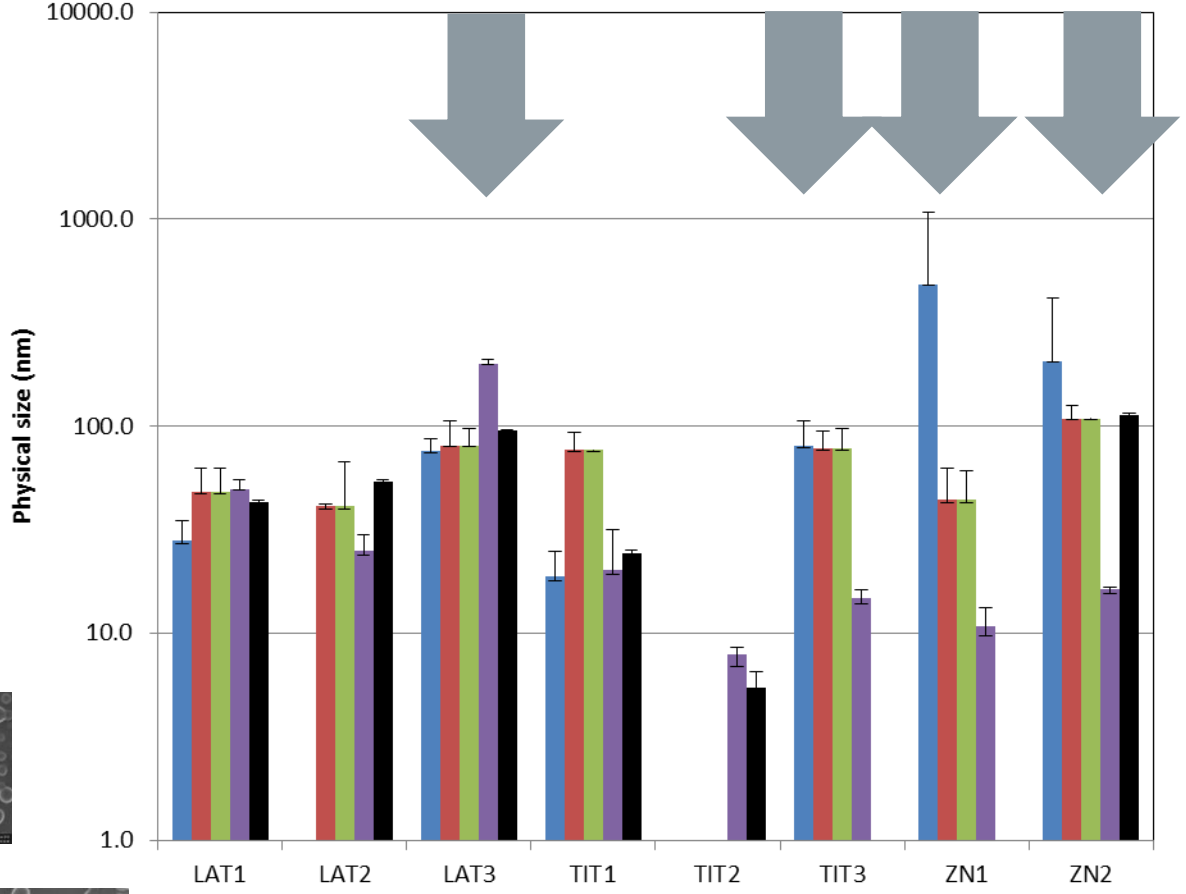
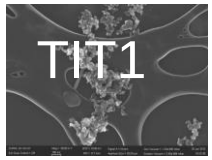
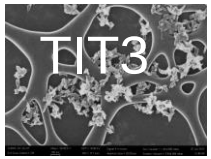
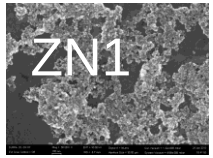
Three simple challenge results: #1) What is the primary particle size?



NanoSustain







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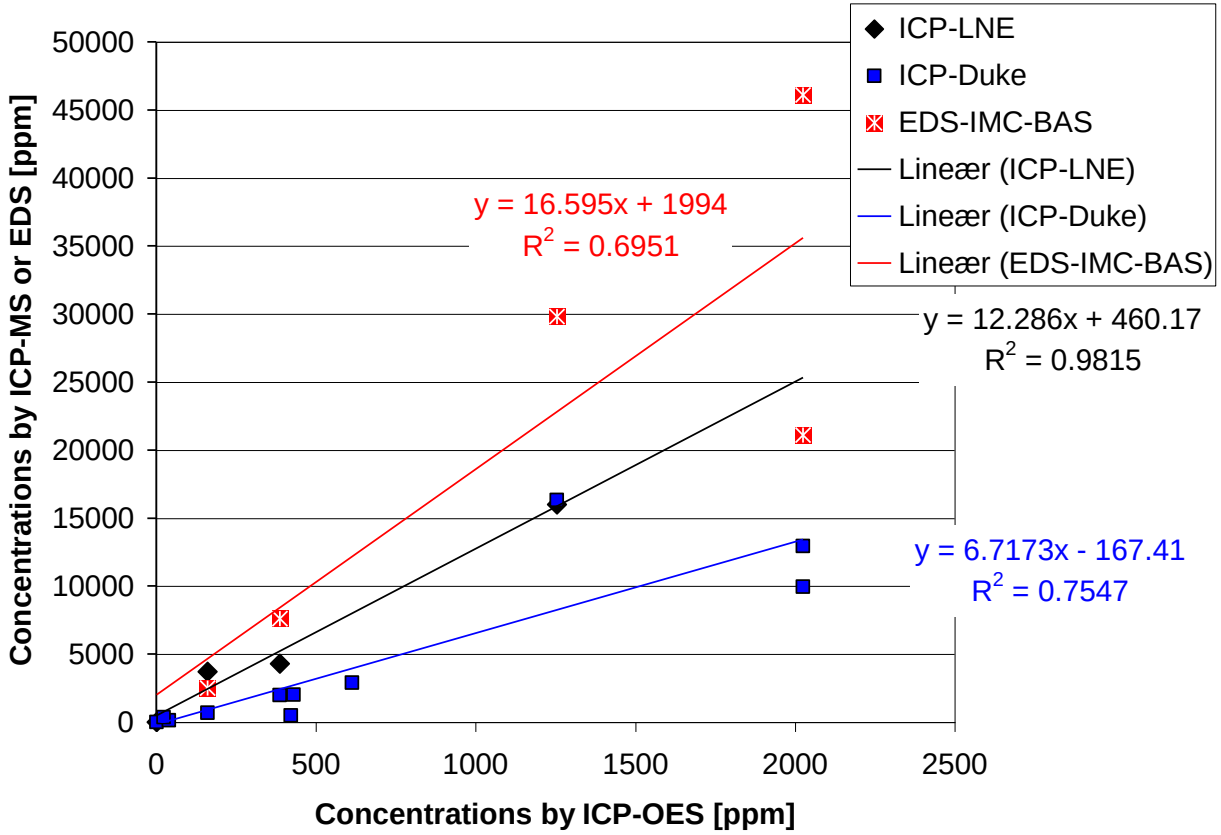
Three simple challenge results: #2) Metal impurity concentrations in my CNTs?

Apparent problems in getting agreement in quantitative elemental analysis of CNT due to different extraction procedures



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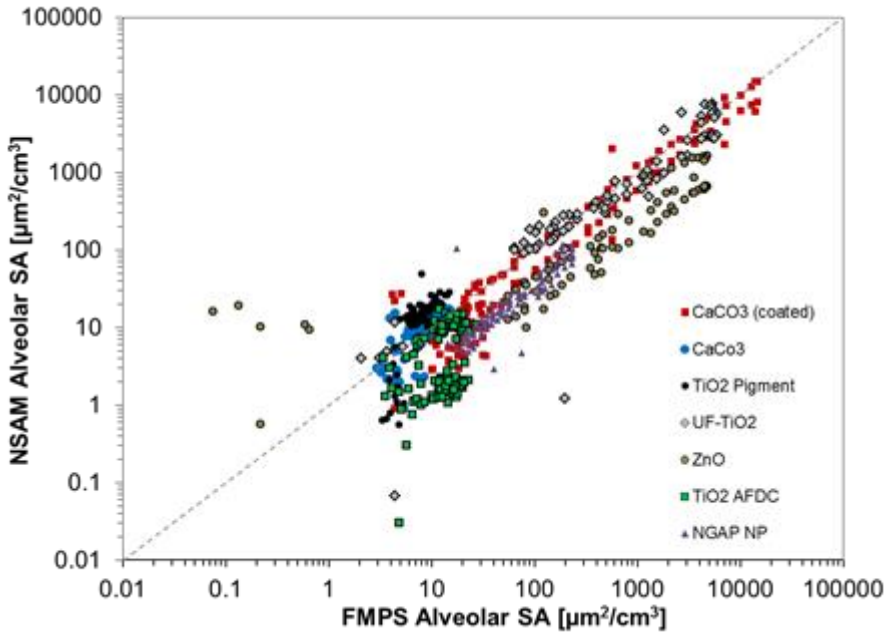
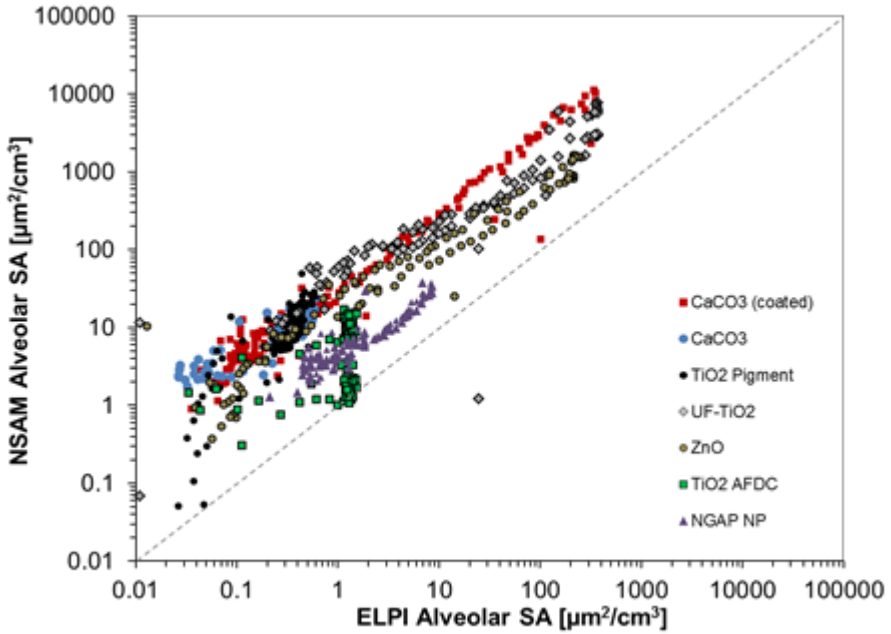
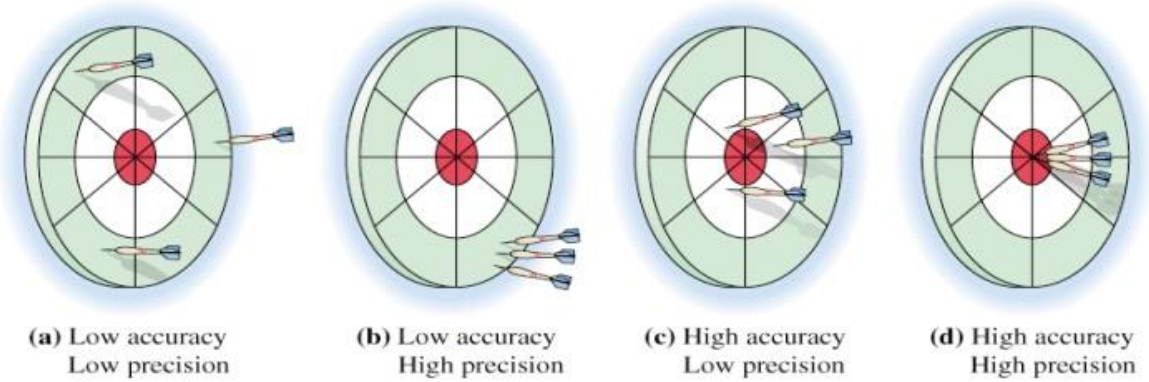
Three simple challenge results: #3 What is the airborne lung-deposited particle surface area





Levin et al. (2016) Aerosol and Air Quality Research

Is data comparability in previous projects of sufficient quality?



Maybe – But doubtfull

Generate a set of PC data based on identified best methods and harmonized protocols

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