

Data-rich OECD WPMN test materials - suitable for establishment and testing of grouping, read-across and risk assessment models?

Tomasz Berezniak, Nicklas Raun Jacobsen & Keld Alstrup Jensen (kaj@nrcwe.dk)

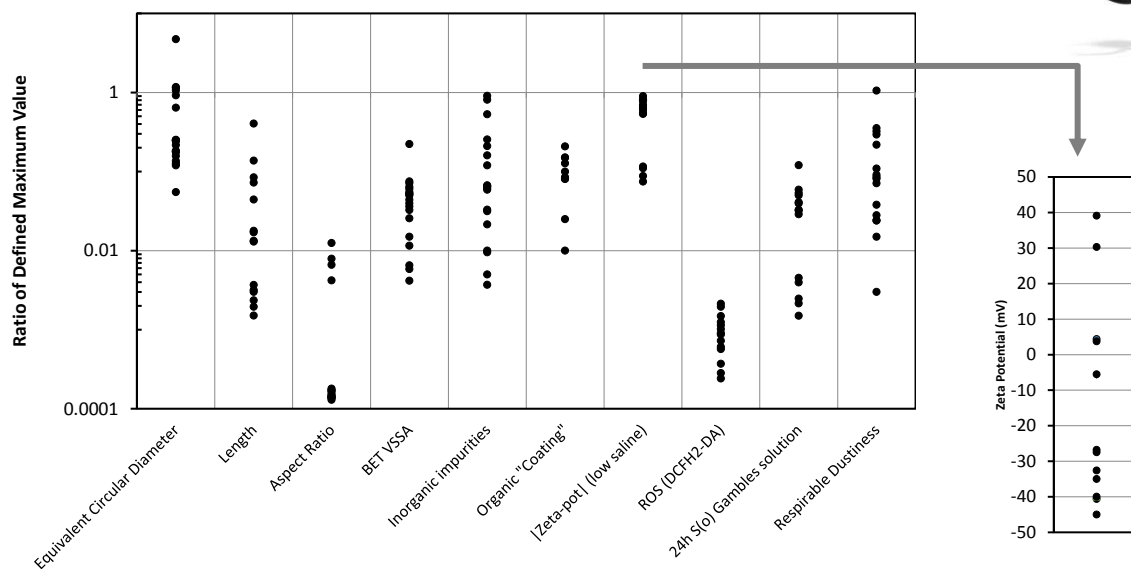
AIM

TO MAP THE HISTORICAL DATA ON THE OECD WORKING PARTY ON MANUFACTURED NANOMATERIALS (WPMN) TEST MATERIALS AND INVESTIGATE HOW REPRESENTATIVE THE OECD WPMNM TEST MATERIALS ARE FOR GROUPING AND MODEL DEVELOPMENT CONSIDERING RANGES IN KEY PHYSICOCHEMICAL PROPERTIES.

Conclusions

- I. The most complete existing data set were found for the OECD WPMN TiO₂ (NM-100 to NM-105), Synthetic Amorphous Silica (NM-200 to NM-204), ZnO (NM-110 to NM-113), and MWCNT (NM-400 to NM-403), but some data gaps still exist.
- II. The physicochemical variation in the 19 selected most data rich OECD WPMN test materials appears insufficient to establish nor demonstrate grouping or read-across principles.
- III. The data on the 19 OECD WPMN materials data may be suitable for demonstrating elements of risk assessment tools.
- IV. It is necessary to expand the set of suite of extensively well-characterized and toxicologically tested MN to generate sufficient dynamic range in the physicochemical properties. In particular, greater ranges in size, fiber length, aspect ratio, coating, zeta-potential, ROS (reactive oxygen species) formation capacity, and solubility with improved chemical variability is needed.

Relative Ratio covered for Key Physicochemical Properties
Ratio = [Measured Value / Maximum range for MN]



Applied Nanomaterial Scaling Range

Material scaling range	Equivalent Circular Diameter*	Length*	Aspect Ratio*	BET VSSA	Inorganic impurities	Organic "coating"	Zeta-pot (low saline)	ROS (DCFH2-DA)	24h S(o) Gambles solution	Respirable Dustiness
	nm	nm	ratio	cm ² /cm ³	wt%	wt%	mV	Fluorescein/(mg/mL)	Fraction of 0.32 mg/mL	mg/kg
Maximum range	100	10,000	10,000	6,000	20	20	50	15,000**	1	10,000
Minimum range	1	1	1	1	0	0	-50	0	0	0

* Dispersed NOAA: Nano-objects and their aggregates and agglomerates

** Maximum value is set arbitrary considering the ROS formation capacity by CuO (13,938 Fluorescein/(mg/mL))