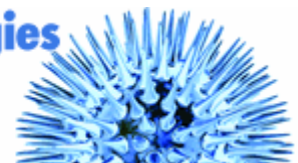
Breakout Session Number 1

Breakout Session Name

Facilitator - Hatto

ISO IEC NIST OECD

Nanotechnologies
International Workshop
26-28 February 2008



Documentary standards needs: Fundamental characterization – physical, chemical and structural

- Needs for EH&S
- Needs for industry

P-Chem characterization for OECD sponsorship programme

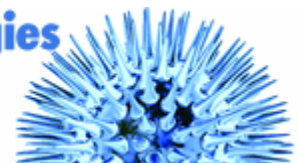
Agglomeration/aggregation
Water solubility
Crystalline phase
Dustiness
Crystallite size
Representative TEM picture(s)
Particle size distribution
Specific surface area
Zeta potential (surface charge)
Surface chemistry (where appropriate)
Photocatalytic activity
Pour density
Porosity
Octanol-water partition coefficient, where relevant
Redox potential
Radical formation potential
Other relevant information (where available)

Relevant standards

Physico-chemical property	agglomeration/ aggregation	composition	concentration	crystalline phase	dustiness	fat solubility/ oleophilicity	grain size	hydrodynamic size/particle size measureme	length	purity	shape	Specific surface area	surface charge	surface chemistry	water solubility/hydrophilicity	Zeta potential	Catalytic properties
relevant OEDC TG						116 Fat Solubility			110 Particle Size								
Relevant standards																	
suitable technique(s) - Dispersion: A – Airborne, S - Solid, L - Liquid	*- No easy methods – light scattering, small angle neutron and x-ray techniques. Critically dependant on surface charge/compositi*	*Bulk: Elemental Analysis, ICPMS, EDX, EELS*		*Powder XRD, HR-TEM, Raman spectroscopy (S)*			*Powder XRD, SEM, TEM (S)*	*Scanning Mobility Analysis (SMPS) (Zeta and above Transmission/Scanning electron Microscopy Line broadening phenomena in Dynamic Light scattering (for*	*SEM*		*Electron Microscopies (TEM/SEM) (S)*	*- BET methods (Gas Isotherm – solid samples - Surfactant BET methods for liquid*	*- Electrometer measurements (difficult no applicable to bulk - Single particle AFM (not Voltammetry and*	*- Surface Analytical Techniques - Radiation beam methods – (IR, NIR, Raman - Electron miscopies*	*- Traditional techniques (monitor solution*	*- Electrophoretic mobility – laser light scattering*	
ASTM committees/subcommittee					ASTM E35.22			ASTM E29; ISO/TC 24/SC4	ASTM D22.07								
ASTM	none				Evaluation of Airborne Dust		ASTM E112-96(2004)e2	B859-03 Standard Practice	ASTM D6480-05 Standard Test			B922-02 Standard Test		Characteristics of Beryllium Oxide			
ASTM								WK1127 New Guide for Powder	ASTM D6281-06 Standard Test								
ASTM								ASTM E1919-07 Standard Guide	ASTM D5755-03 Standard Test								
ISO committees/subcommittee																	
ISO	none	ISO/AWI TS 10798 Scanning					ISO 16700:2004 Microbeam	ISO 9277:1995 Determination of	ISO 16700:2004 Microbeam	ISO/AWI TS 10929	ISO/AWI TS 10797 Use of			ISO NP/TS 10867 Use of NIR --			
ISO		ISO/AWI TS 10929					ISO/AWI TS 10797 Use of	ISO 13320-1:1999 Particle	ISO/AWI TS 10929	ISO/AWI TS 11308N	ISO/AWI TS 10798 Scanning			ISO NP/TS 10868 Use of UV-Vis-			
ISO							ISO/CD 15900 Determination of	ISO 13321:1996 Particle size			ISO/AWI TS 10929						
ISO								ISO/TS 13762:2001									
ISO								ISO 21501-2:2007									
ISO								ISO 21501-3:2007									
ISO								ISO 21501-4:2007									
ISO								ISO 16700:2004 Microbeam									
CEN committees/subcommittee																	
CEN	none			none relevant	EN 15051:2006 Workplace	none relevant	none relevant	EN 725-5:2007 Advanced				EN ISO 18757:2005 Fine			EN 12457-1:2002 Characterisation		
JIS (Japanse Industrial Standards)																	
JIS	none			JIS R 7651:2007 Measurement of			JIS H 7804:2005 Method for									JIS R 1638:2000 Test methods of	

ISO IEC NIST OECD

Nanotechnologies
International Workshop
26-28 February 2008



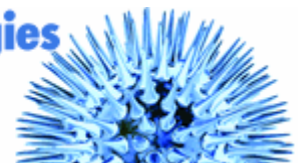
Documentary Standards Needs

- Open source terminology in searchable database – fundamental to future of technology – should be freely available
- Guidance documents rather than standards – should all include EHS issue consideration
  - Sample preparation for characterization, including dispersion and aggregation/agglomeration
  - Sample preparation for tox testing
  - Stability considerations relevant to manufactured nanomaterials
  - Application and limitation of surface analysis
  - Expression of concentration and dosimetry

- Database for documentary standards for nanotechnologies – TC 229?

ISO IEC NIST OECD

Nanotechnologies
International Workshop
26-28 February 2008



Measurement Needs

- Polydisperse reference materials for instrument/measurement performance

Barriers/challenges

- Communication
- Measuring and reporting characteristic
  - Define relevant concepts
  - What information is needed when handling/using nanoparticles
  - What measurement techniques are applicable and their limitations.
- “Quality”

Resources

- Combine resources of different committees and organisations to address cross cutting issues.