



European standardization project on detection and identification of nano-objects in complex matrices

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Sustainable Nanotechnology Conference 2015

5B Tracking NM in complex matrices

A Joint EU-US Conference, *SNO-SUN-GUIDEnano*, Venice Mestre, 2015-03-9/11

Organization	TC / SC	Main Responsibilities
ISO	TC 24 / SC 4	Particle characterization
	TC 142	Cleaning equipment for air and other gases
	TC 146 / SC 2	Air Quality – Workplace Atmospheres
	TC 194	Biological evaluation of medical devices
	TC 201	Surface chemical analysis
	TC 202	Microbeam analysis
	TC 229	Nanotechnologies
	TC 256	Pigments, dyestuffs and extenders
IEC	TC 113	Nanotechnology standardization for electrical and electronic products and systems
CEN	TC 137	Assessment of workplace exposure to chemical and biological agents
	TC 138	Non-destructive testing
	TC 162	Protective clothing including hand and arm protection and lifejackets
	TC 195	Air filters for general air cleaning
	TC 230	Water analysis
	TC 248	Textiles and textile products
	TC 352	Nanotechnologies

ISO/TC 24/SC 4 „Particle Characterization”

WG1 Results representation, WG2-17 Measurement methods

“vertically”, measurement methodology oriented

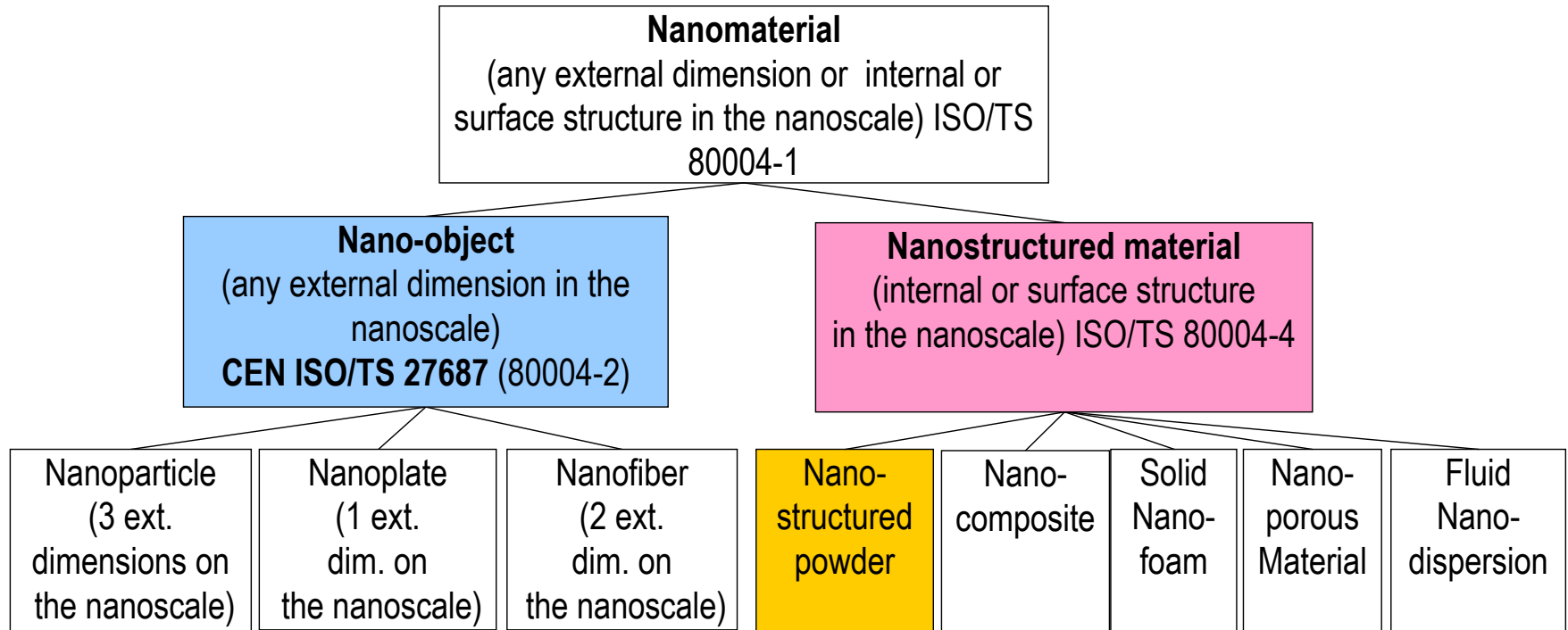
ISO/TC 229 „Nanotechnologies“

WG1 Terminology, WG2 Measurement, WG3 HSE-Aspects, WG4 Material spec.

“horizontally”, interdisciplinary, application oriented

CEN/TC 352 „Nanotechnologies“

WG1 Measurement, WG2 Commercial Aspects, WG3 HSE-Aspects



Assemblies of nanoparticles or nano-objects, which extend the nanoscale, are covered by ISO/TS 80004-4 Nanotechnologies - Terminology and definitions for nanostructured materials

Besides: **NOAA** (Description from WG3, summarization of 2 definitions):
Nano-objects and their larger **Agglomerates** and **Aggregates** (Nanostructured material)

European Commission definition (decision) draft: count median $x_{50,0} < 100$ nm

A vocabulary on particle characterization
with more than 250 definitions
from A like adsorbate to Z like zeta-potential,
which are included within more than 35 published ISO standards,
was published as ISO 26824:2013.

The corresponding definitions are freely available at the
ISO Online Browsing Platform (<https://www.iso.org/obp>) .

Nanotechnologies – Guidance on detection and identification of nano-objects in complex matrices

Scope

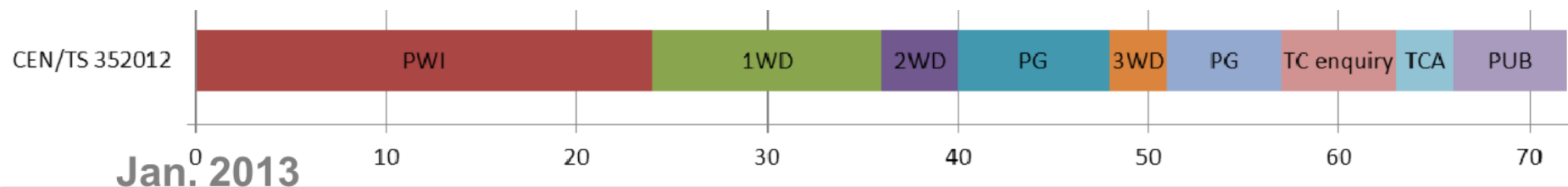
This Technical Specification provides guidelines for detection and identification of specific nano-objects in complex matrices, like liquid environmental compartments and waste water. This Technical Specification assumes a prior knowledge of the nature of the nano-objects like their chemical composition. The selected detection and identification methods are based on combination of size classification and chemical composition analysis.

Corresponding requirements for sampling and sample preparation will be given. Identification can also be supported e.g. by additional morphology characterization. The document will provide links to measurement method standards if available.

Content

- Examples for detection and identification tasks in complex matrices
- Overview of measurement techniques
 - General
 - Not established methods which are still under development
 - Guidance for the selection of a method for a certain task
- Selected measuring techniques for the detection and identification
 - Measuring principle
 - Performance (e.g. sensitivity, selectivity, reproducibility, limits)
 - Sample preparation
 - Interpretation of results

Time frame



Selected measuring techniques and involved experts

1. Field-Flow-Fractionation

Dr. Frank von der Kammer (University of Vienna, Dep. of Environmental Geosciences, AU)

2. Scanning Electron Microscopy

Dr. Ralf Kägi (Eawag - Institute of Aquatic Science and Technology, CH)

3. Transmission Electron Microscopy

Dr. Jan Mast (CODA CERVA, BE)

4. Single-Particle Inductively Coupled Plasma mass Spectroscopy

Dr. Ruud Peters (RIKILT Institute of Food Safety, NL)

5. Alternative methods are described by

Mr. Franky Puype (Institute for Testing and Certification, CZ)

1. Draft (32 pages) *sent out to 28 registered experts
for information and comments in Word-template until 23rd of March, 2015:*

CEN/TC 352

Date: 2015-01-29

TC 352 WI 00352012-Version 1.1

CEN/TC 352

Secretariat: AFNOR

Nanotechnologies — Guidance on detection and identification of nano-objects in complex matrices

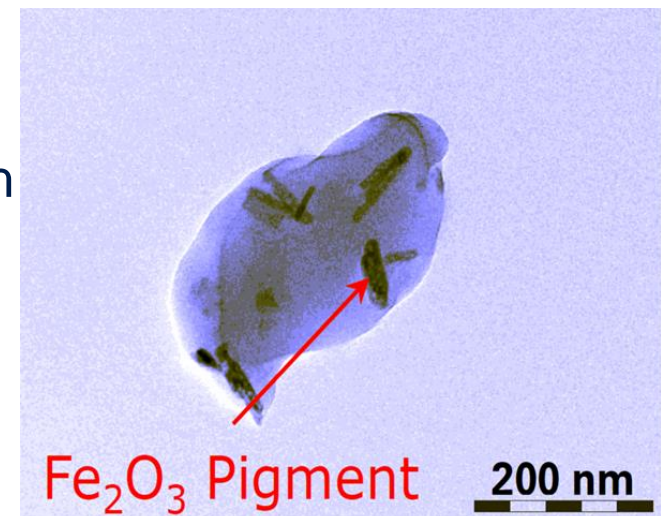
Einführendes Element — Haupt-Element — Ergänzendes Element

Nanotechnologies — Guide pour la détection et l'identification des nano-objets dans des matrices complexes

5. Examples for detection and identification tasks in complex matrices

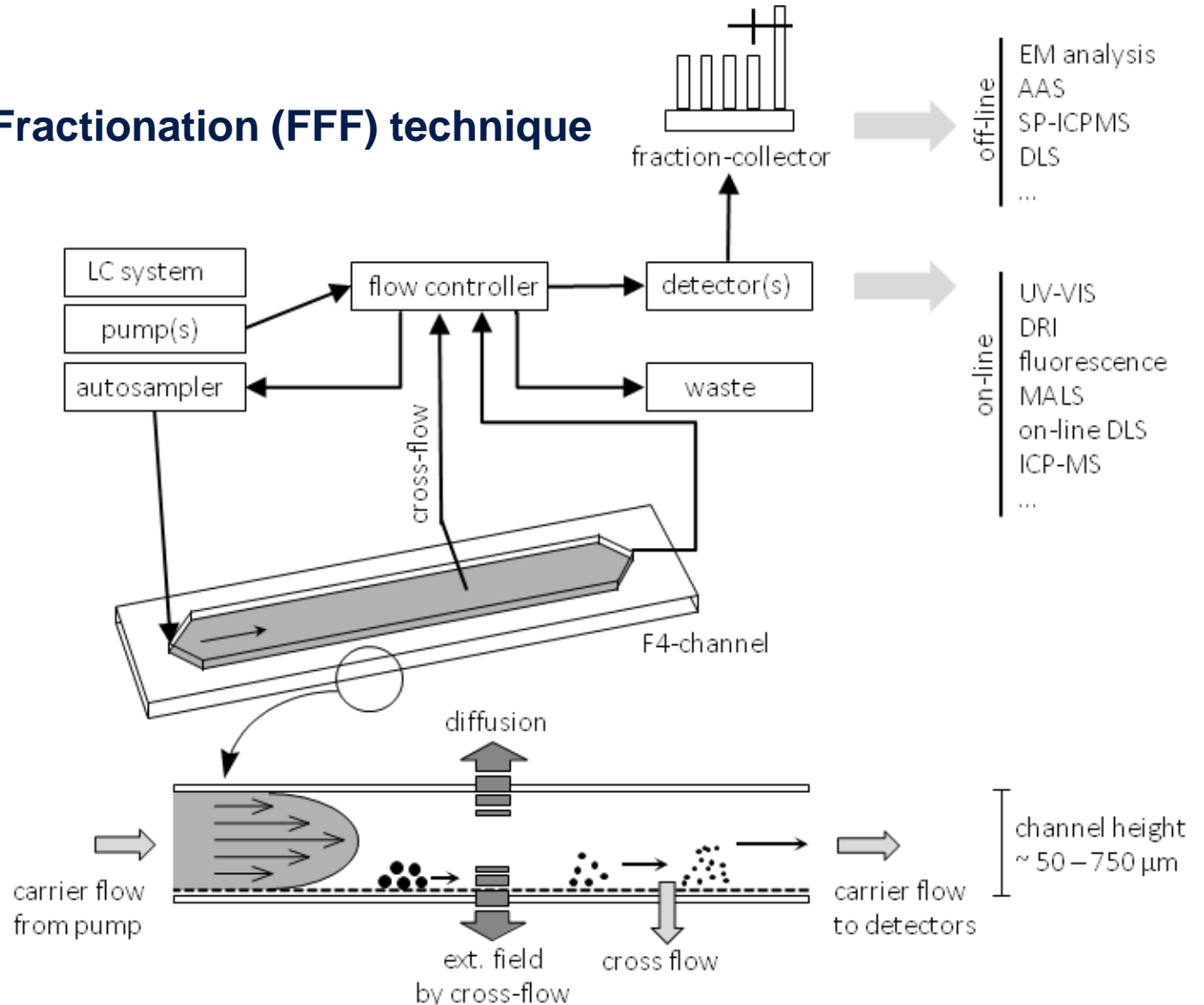
For product safety or risk evaluation studies several examples are under investigation in different European research projects like silica in tomato soup (finished project: NanoLyse) or titania in sun-lotion or silver nanoparticles in waste water or pigment and filler nanoparticles in surface coatings or polymer composites as well as carbon nanotubes in composites.

Elementary composition or morphology are already known properties of this manufactured nano-objects and should be used to distinguish it from natural background nano-objects.



Example 7.1:
Flow-Field-Flow-Fractionation (FFF) technique

Figure 1 —
Layout and
separation
principle of F4
(by courtesy of
F. von der Kammer)



CEN/TC 352/WG 3/PG 2 meeting on **April 1st, 2015** (9:00 to 12:00)

European Commission Joint Research Centre / Nanobiosciences Unit

Via E. Fermi, 2749, 21027 Ispra (VA), ITALY

- 1 Welcoming and opening of the meeting (9:00 am)
- 2 Roll call of experts
- 3 Adoption of the agenda CEN/TC 352/WG 3/PG 2 N 015
- 4 Approval of the last WG 3/PG 2 meeting's minutes held on 2014/10/15
- Comments CEN/TC 352/WG 3/PG 2 N 013
- 5 Presentation of the first PWI draft CEN/TC 352/WG 3/PG 2 N 014
- *Field-Flow-Fractionation* – *Scanning Electron Microscopy*
- *Transmission Electron Microscopy*– *Single-Particle-ICP-MS*
- *alternative characterization methods*
- 6 Presentation and discussion of comments
- sent until 23rd of March, 2015
- 7 Actions to be agreed
- next steps, time table
- 8 Preparation of the next meeting
- date, venue, home work
- 9 Any other business

You are invited to contribute

- as an invited guest at the next Project Group meeting
- by correspondence as expert with the project leader

Please contact michael.stintz@tu-dresden.de

Thank you!