3P INSTRUMENTS

Characterization of
particles · powders · pores

3P Nanotest

A multi-step procedure, based on

- **Optimal dispersion of particles** in a suitable liquid medium
- **Quantitative particle separation** in defined size fractions by taylor-made procedure
- **Determination of particle size distribution** of each fraction
- **Automatic evaluation** and nano/non-nano identification by 3P Nano-Report Software©

Nanomaterial identification
in accordance with EU recommendation (2022/C 229/01)

3P Nanotest

Task

Identification of an existing substance (powder, dispersion) **as nano- or non-nanomaterial according to EU commission recommendation 2022/C 229/01**.

For this purpose, a nanomaterial is defined as a natural, incidental or manufactured material consisting of solid particles that are present, either on their own or as identifiable constituent particles in aggregates or agglomerates, and where 50 % or more of these particles in the number-based size distribution range in one or more external dimensions from 1 nm to 100 nm.

Requirements

- Particles in liquid dispersion
- No mixture of powders of different physical/chemical properties
- No emulsion droplets, only hard and soft particles
- No particles of an elongated shape (rods, fibers, tubes) or of a plate-like shape

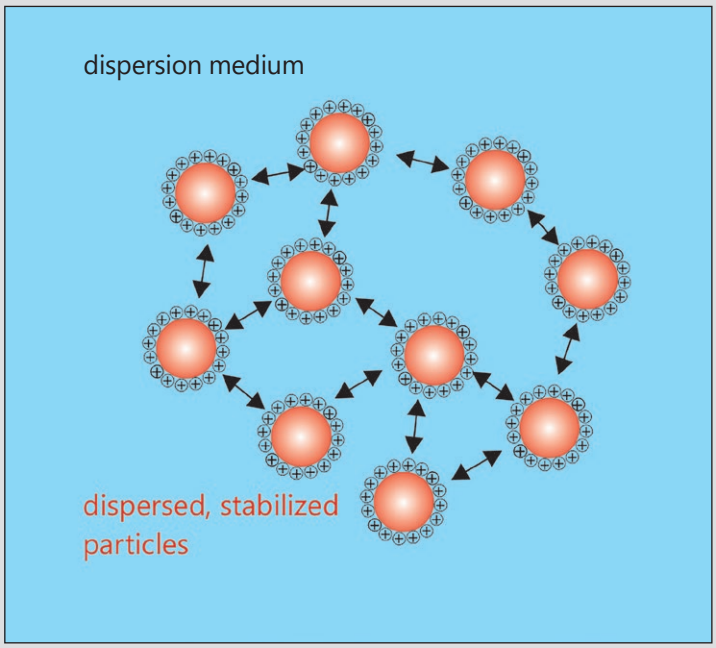
3P Nanotest

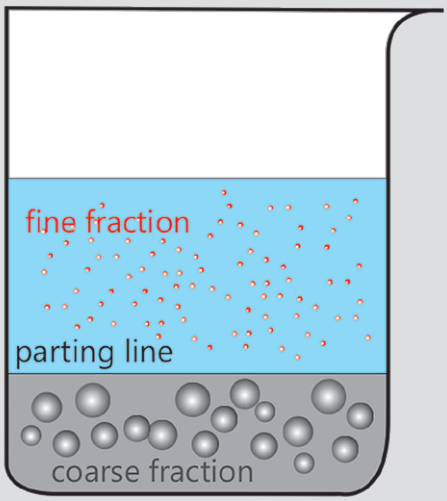
STEP 1: Dispersion of the material

- Selection of a suitable dispersion medium
- Optimization of the solids content
- De-agglomeration procedure to achieve a sufficient separation and stabilization of the individual particles
- Sufficient stabilization of the particles for the nanotest procedure

STEP 2: Accurate quantitative separation into two (or more) fractions

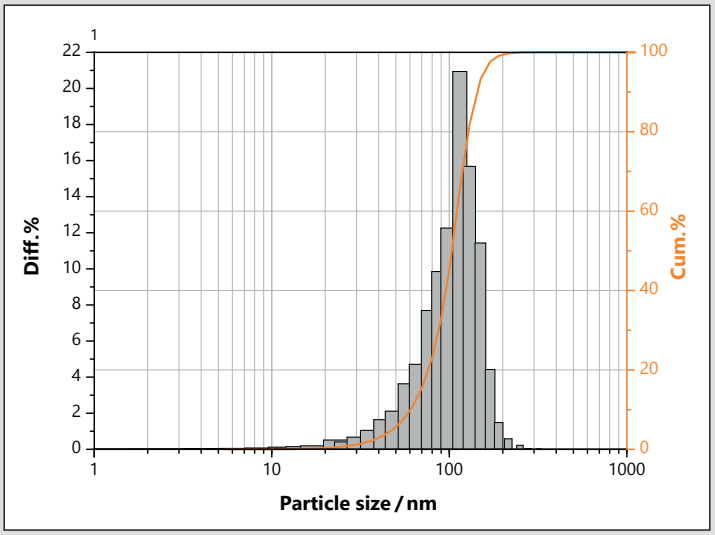
- One fine fraction between 100 and 200 nm, one or more coarse fraction(s) >200 nm
- Using of material-related, suitable separation techniques (e. g. adapted centrifugation)
- Multistep procedure with separation quality check



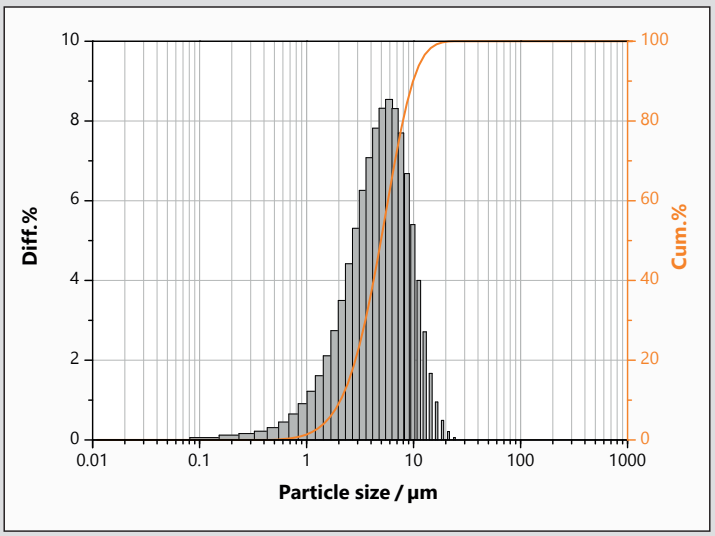


STEP 3: Comprehensive Characterization of each fraction

- Determination of the quantitative proportion of each fraction (dry residue)
- Verification of the results with supplementary methods (microscopy, BET analysis)
- Measurement of particle size distribution of each fraction with suitable method (DLS, laser diffraction, image analysis etc.)



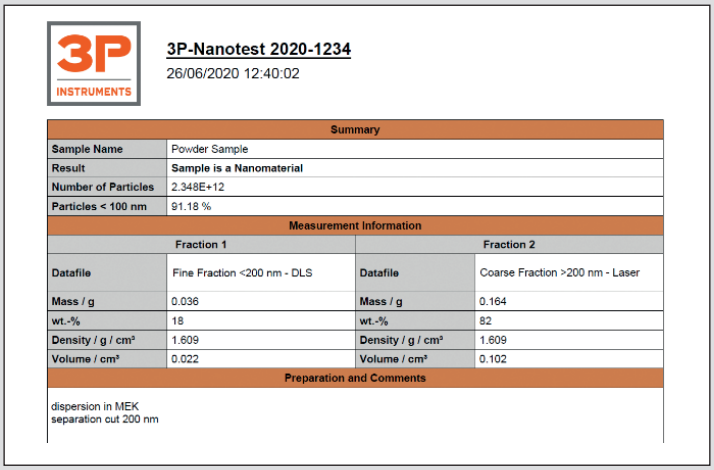
3P-Nanotest, fine fraction < 200 nm, volume distribution (DLS, BeNano 180 Zeta Pro)



3P-Nanotest, coarse fraction > 200nm volume distribution (Laser diffraction, Bettersizer S3 Plus)

STEP 4: Particle number and nano/non-nano identification using 3P Nano-Report Software©

- Counting of the particle number of each size class on the basis of the results of step 3
- Comparing the particle number "≤ 100 nm" with "> 100 nm" and nano classification



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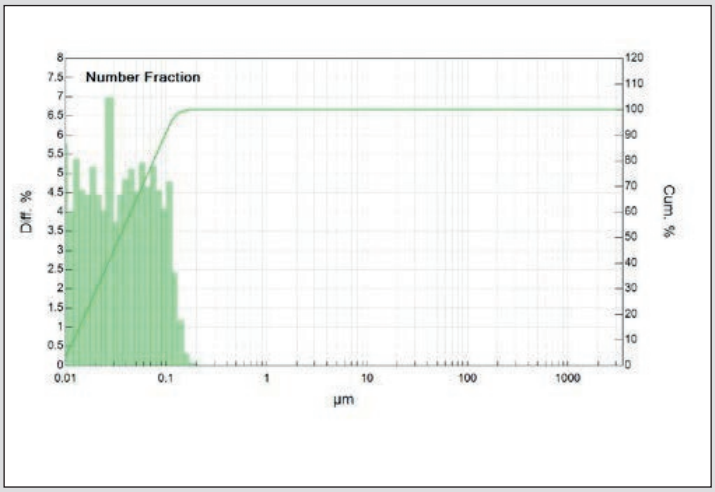
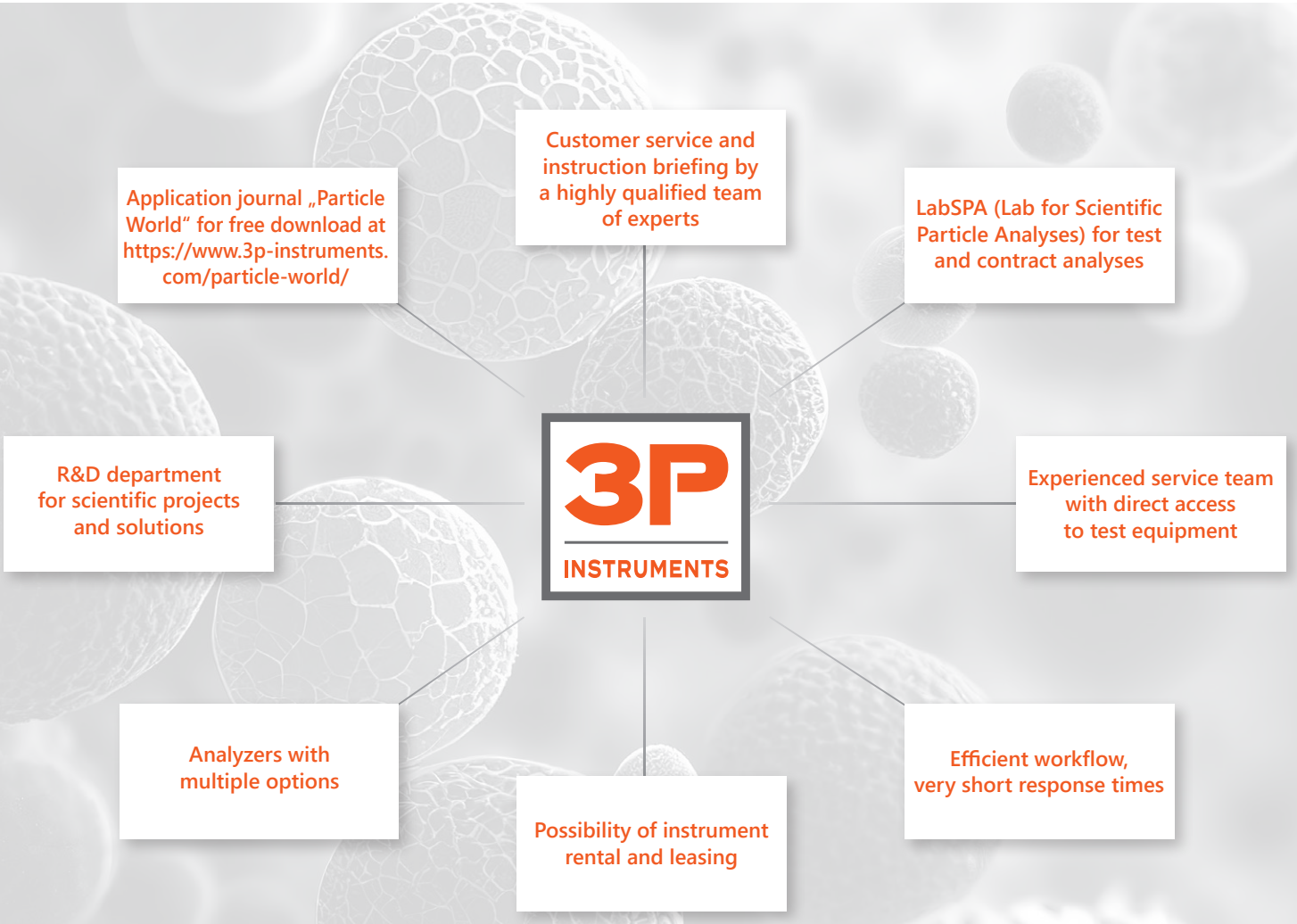
Summary			
Sample Name	Powder Sample		
Result	Sample is a Nanomaterial		
Number of Particles	2.348E+12		
Particles < 100 nm	91.18 %		
Measurement Information			
	Fraction 1		Fraction 2
Datafile	Fine Fraction <200 nm - DLS	Datafile	Coarse Fraction >200 nm - Laser
Mass / g	0.036	Mass / g	0.164
wt.-%	18	wt.-%	82
Density / g / cm³	1.609	Density / g / cm³	1.609
Volume / cm³	0.022	Volume / cm³	0.102
Preparation and Comments			
dispersion in MEK separation cut 200 nm			



Your partner in particle characterization

3P Instruments has over 30 years of profound expertise in the characterization of emulsions and dispersions, of particles and powders as well as surfaces and pores.



More info & inquiry:

https://www.3p-instruments.com/contract-analyses/#dispersion-projects

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