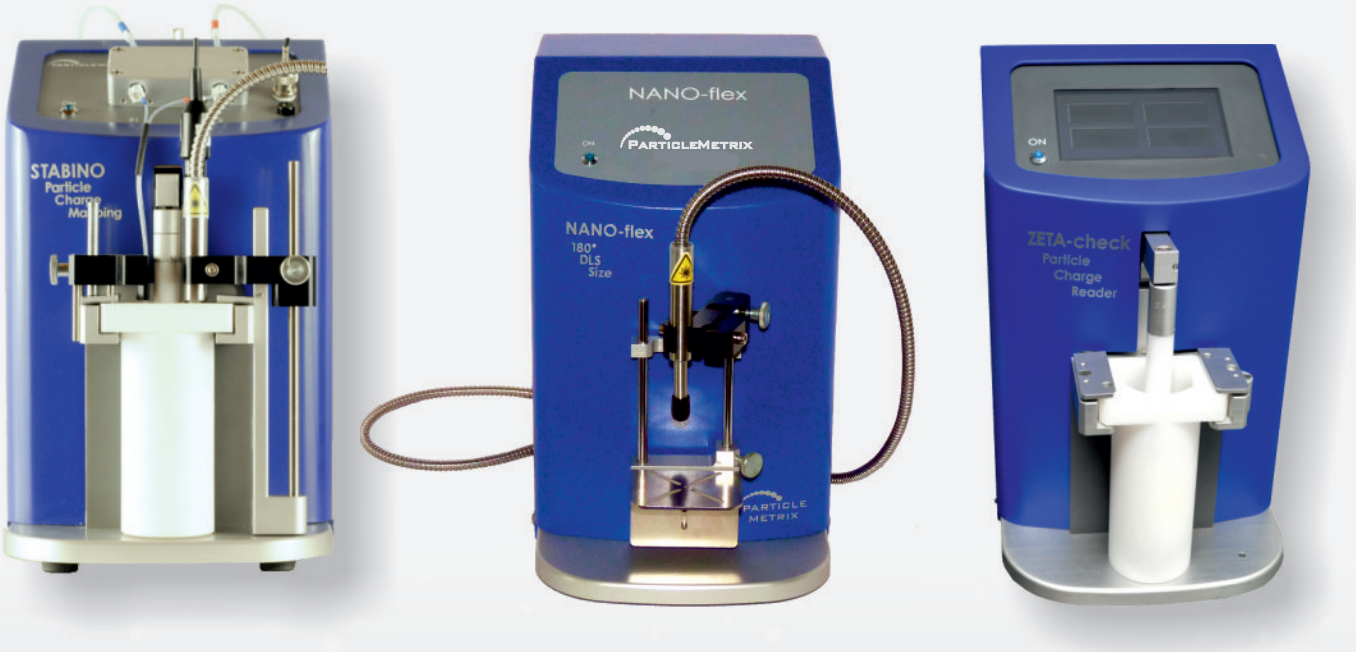
COLLOID METRIX

Particle Charge Titration
Zeta Potential
Size Distribution



Stabino®

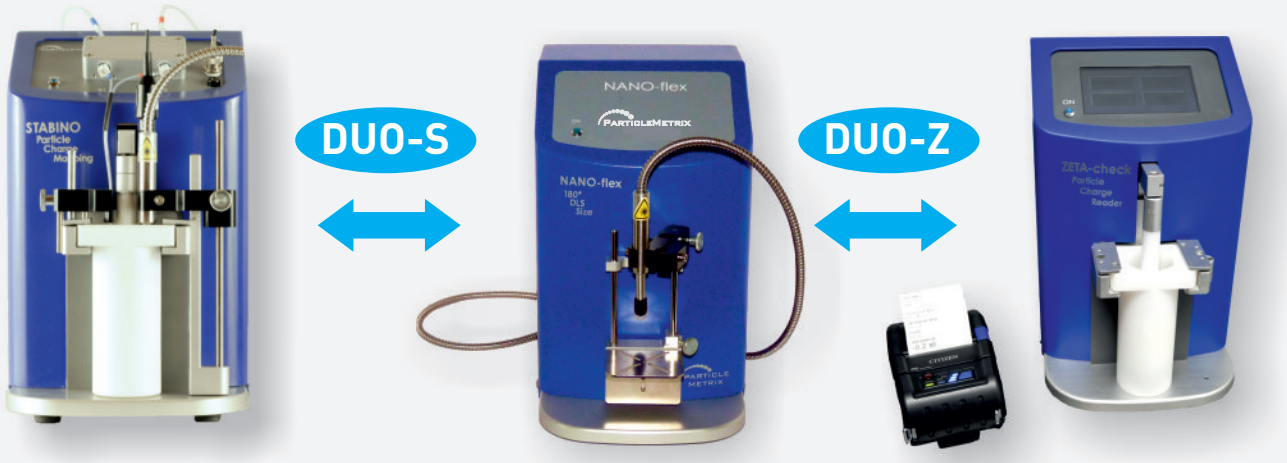
NANO-flex®

ZETA-check
(without Titration)

Stabino® • ZETA-check

Rapid Particle Charge Titrations and Size Distribution

In many applications, particle charge and particle size characterise the behaviour of a dispersion. The Stabino® - NANO-flex® System is derived from the StabiSizer® - analysis instrument. It provides higher flexibility and is applicable to colloids with particle sizes between sub-nm and 100 µm. Measurements at concentrations up to 40% are possible.



Stabino® **NANO-flex®** **ZETA-check** (without Titration)

Method

The "heart" of the Stabino® is a cylindrical PTFE chamber with an oscillating piston, both carrying only very little anionic charge at the surface (Figure 1). The cylinder contains 1 mL and 10 mL sample respectively. The addition of titrands is controlled via two incorporated precision titration pumps delivering titrand solution from one or the other reservoir.

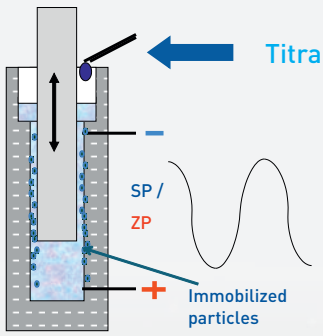


Figure 1: Sample cell with oscillating piston and oscillating streaming potential SP.

A fraction of the particles in the cell is immobilised at the surface of the wall. Therefore, with the piston movement Δv, the mobile cloud of the double layer of the immobilised particles is pushed up and down. That oscillating ion cloud produces an alternating voltage SP = streaming potential at the two electrodes. It is proportional to the zeta potential of the particles.

The Particle Interface Potential, like the streaming potential measured in Stabino®, represents the degree of electrostatic repulsion between particles and reacts to pH, conductivity and the poly-electrolyte surrounding, respectively. Any or all of these parameters can cause a material system to shift. The titration result is characteristic for the sample in a certain chemical environment. A charge titration with the Stabino® specifies which parameters require special attention.

Close to reality Multi-Parameter Particle Charge Mapping (3D - Plot)

The intuitive tablet PC controlled automatic titration of the Stabino® opens the way to particle charge finger-printing of colloids and dispersions. The isoelectric point is reached quickly, gathering information on charge density and stable zones, whilst pH, conductivity and temperature are measured simultaneously.

Applications

The sensitivity of the streaming potential depends on surface area. This criteria may be used to follow changes in surface area, as it happens in milling processes. Secondly, the smaller the particles are, the more sensitive the method is.

COLLOID METRIX

NANO-flex® - 180° DLS

Particle Size Distribution

The NANO-flex® 180° DLS System measures size distributions in the range of 0.3 nm to 10 µm. The applied heterodyne 180° back scattering principle of the Nanotrac® is characterised by its high selectivity in the nano-range and is therefore also suitable for samples with broad size distribution. Further more, the resolution is impressing, as demonstrated in page 4. Highly concentrated samples are measured without interfering multiple scattering.

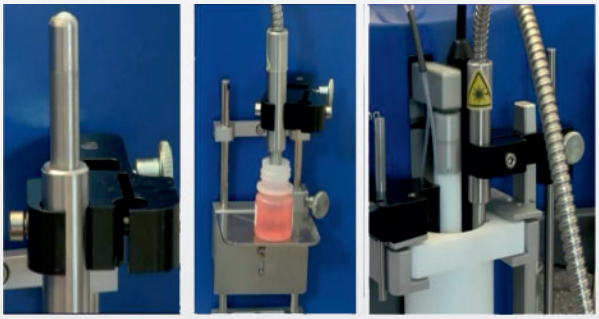
The applied Nanotrac® back scattering in the NANO-flex® is designed as a flexible measuring probe with 8 mm ø. Thus, it can be used in many ways, even in-situ and in the measuring cylinder of the Stabino®!

The 180° DLS–Method

The laser is focused to the sample via an optical fiber and a sapphire window. The window reflects a part of the incoming laser light. Both, laser reflection and scattered light interfere at the detector diode. Due to the excellent signal/noise ratio, there is no need for an expensive detection system.

Benefits of 180° DLS

- Shortest light path in the sample (<0.3 µm) implying
  - o no multiple light scattering
  - o samples from transparent to opaque
- up to 40% v/v from 0.3 nm to 10 µm
- size result does not change over decades of sample concentration
- high dynamic range and high resolution in ONE measurement



One drop ● i n nearly every vessel ● with Stabino®

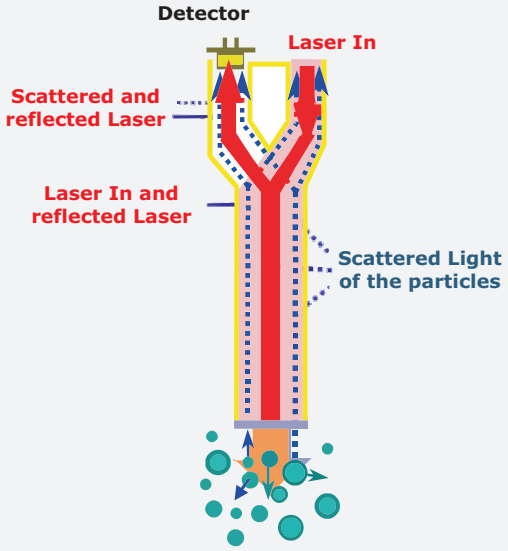


Figure 2:
The described 180° DLS-method.

Applications

DLS applications with the NANO-flex® module are almost unlimited, provided the viscosity of the sample is in the Newtonian range, a condition for the free Brownian movement in the fluid and for the accurate calculation of the size. The liquid medium of the particles can be of organic or aqueous nature. The critical coagulation point of a dispersion can be determined by measurement of size and potential with the Stabino®. For this purpose, the NANO-flex® size sensor is dipped into the Stabino® measuring cylinder.

THE DUO - One package for one or two Workspaces

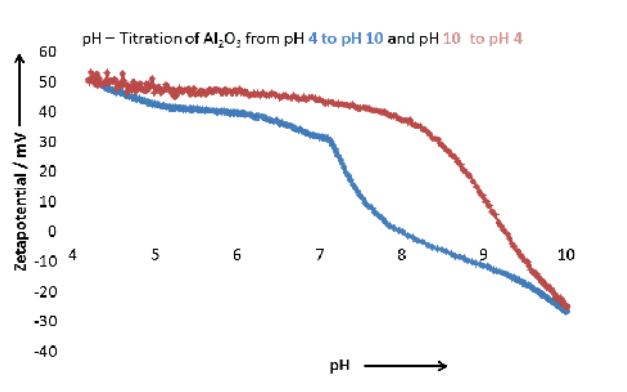
Analysis instruments with two methods integrated in one casing often have the disadvantage that they cannot be operated by two different groups. The use of a second PC is the only requirement to use both the Stabino and NANO-flex® separately.

Simple information as provided by Stabino® / ZETA-check and NANO-flex® lead rapidly to the desired results.

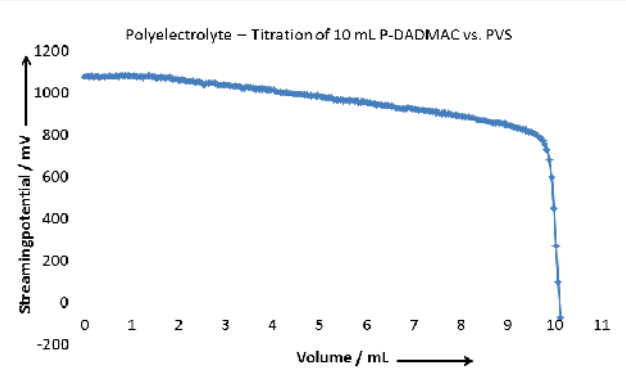
Combination with ZetaView® possible

Zeta Potential Titrations

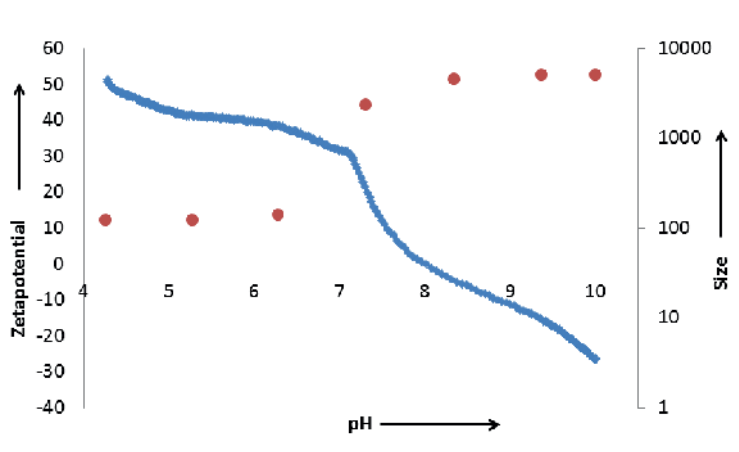
Rapid pH Titration



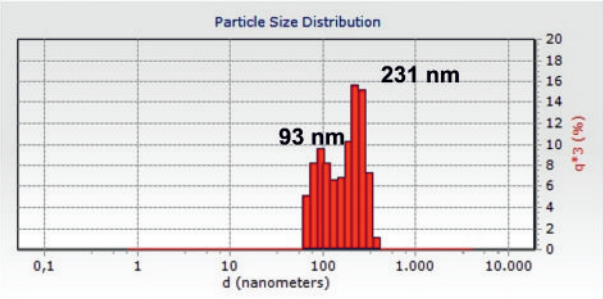
Rapid Polyelectrolyte Titration



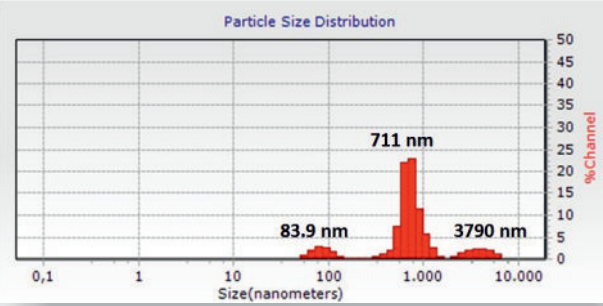
All Titrations simultaneously with Size



180° DLS with high resolution!



Multimodal samples

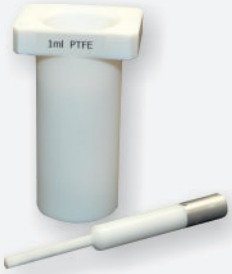


COLLOID METRIX

Accessories



Measuring cell
10 mL



Measuring cell 1 mL
including piston



Measuring cell 10 mL
-black-



Tempered measuring cell
from 0°C to 90°C



Piston set

- 100 µm
- 200 µm
- 400 µm
- 1000 µm
- 1200 µm
- 1500 µm
- 2000 µm conical

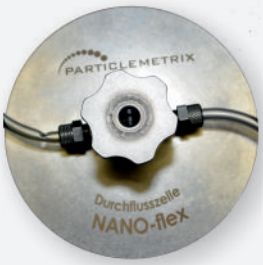


pH electrode

- Glass
- Gel



Cap for
measuring cell



Flow/pressure measuring cell
for NANO-flex®



Printer for
ZETA-check®



Bag for
Stabino®, NANO-flex®
or ZETA-check



Battery for
Stabino®, NANO-flex®
or ZETA-check



Transport case for
Stabino®, NANO-flex®
or ZETA-check

COLLOID METRIX

Colloid analyzers Technical Data

	Stabino®	NANO-flex®	ZETA-check
	Charge	**Size**	**Charge**
Measurement principle	Zeta streaming potential	180° heterodyne back-scattering setup - Laser-amplified scattering reference method (FFT-PS)	Zeta streaming potential
Size range	0.3 nm - 300 µm	0.3 nm - 10 µm	0,3 nm - 300 µm
Measurement period	Potential from 10 sec. Titration 5 - 10 min.*	from 10 sec.	30 sec.
In-situ	—	✓	—
Potential	±3000 mV	—	±3000 mV
Mobility	± 14 µm/s/Vcm	—	± 14 µm/s/Vcm
Reproducibility: - Size - Zeta potential	— 2% with standard dispersion	1% with standard dispersion —	— 2% with standard dispersion
Titration	✓	—	—
pH-range	1 to 14	1 to 14	1 to 14
Temperature range	0°C - 90°C	0°C - 90°C	0°C - 90°C
Conductivity	up to 350 mS cm^{-1}	independent	up to 350 mS cm^{-1}
Sample concentration	up to 40 vol.%*	up to 40 vol.%*	up to 40 vol.%*
Sample volume	from 950 µl**	from 10 µl	from 950 µL**
Sample type	polar - aquaeous	organic or aquaeous	polar - aquaeous
Molecular weight determination	—	300 Da - 20 Mda (hydrodynamc and Debye)	—
Titration: End points	pH, zeta potential, conduc-tivity, volume and time	—	—
Dimensions (WxHxD)	180x300x260	180x300x260	180x300x260
Weight	8 kg	6 kg	8 kg
Power supply	100 - 240 V	90 - 240 V	100 - 240 V

* dependent on sample ** dependent on measuring cup

CE approved.

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