

# **Solutions for Particle Characterisation**

- Differential Centrifugal Sedimentation (DCS)
- Nanoparticle Tracking Analysis (NTA)
- Single Particle Extinction and Scattering (SPES)
- Dynamic Light Scattering (DLS)

# **Differential Centrifugal Sedimentation**

The **CPS Disc Centrifuge** is an ultra-high resolution particle size analysis instrument, based on the principle of **Differential Centrifugal Sedimentation (DCS)**. Rather than using predictive algorithms, the CPS physically separates and characterises particles of different sizes, allowing resolution of peaks with as little as **2% difference in size**.

Highly poly-dispersed particles can be measured in the size range of  $\sim$ 3.0nm to  $\sim$ 60 microns, at 2 to 10 times better resolution than any other particle sizing instrument.



The chart demonstrates the ultra-high resolution capabilities of the DCS technique in being able to clearly separate the 9 peaks of a multi-modal Polystyrene sample.

### **Key Applications**

- Protein clusters
- Cell fragments
- Silica dispersions
- Oil emersions
- Carbon nanotubes
- Inks/pigments
- Gold/silver nanoparticles
- Micro-spheres

#### Performance

- VItra-high resolution particle sizing - detect & measure subtle differences in particle size
- Wide dynamic range broad
  & multi-modal distributions
- ✓ Highly reproducible results
  - consistent across different
  - instruments & users

The CPS Disc Centrifuge is able to measure samples with a wide dynamic range, evidenced here in a measurement of a bi-modal silica sample, verified by TEM analysis.



# **Nanoparticle Tracking Analysis**

The **ZetaView®** is a next generation **Nanoparticle Tracking Analysis** (NTA) instrument for measuring hydrodynamic particle size, zeta potential and concentration through analysis of a video sequence at 11 separate positions in a flow cell.

Each individual particle in the 3nL field of view is counted and tracked in short video clips, creating accurate concentration calculations and particle size distributions. The ZetaView® combines these Brownian Motion measurements with classical micro-electrophoresis to determine **zeta-potential**. These parameters can be measured both in scattering mode and in fluorescence mode, for the determination of fluorescently labelled sub-populations.



The 10x objective of the ZetaView allows analysis of up to 200 particles in the field of view – yielding superior concentration results.

### **Key Applications**

- Fluorescently labelled nanoparticles
- Extracellular Vesicles (EVs) and Exosomes
- Drug delivery
- Liposomes and Micelles
- Viruses and Virus-like Particles

#### Performance

- Scanning NTA measurements taken at 11 different positions in the sample cell
- Auto-alignment & focus automatically optimised, saving time & removing bias
- Fast measurements size & concentration readings can be achieved in just 90 seconds
- Quick, easy cleaning a quick flush, which takes less than a minute!
- Intuitive software traffic-light system for instant indication of suitable sample concentration
- Compact all-in-one design highly compatible with the laboratory environment; small footprint and data files
- Discrimination power by fluorescence measurements

# **Single Particle Extinction & Scattering**

The **Classizer ONE** is a cutting-edge particle analysis platform that utilises the patented **Single Particle Extinction and Scattering (SPES)** method for the analysis, characterisation, and measurement of particle size distributions of **hetergenous particle mixes**.

Used for research, tailored **particle development**, **dispersions formulations**, and **quality control** in life sciences, nutraceuticals, cosmetics, pigments, inks, cements, abrasives, agrochemicals & environmental sciences.



Particle size distribution and number concentration are calculated for different materials in a heterogeneous solution, even for overlapping particle size distributions (PSDs).

### **Key Applications**

- Gold & Silver nanoparticles
- Liposomes & emulsions
- Encapsulations
- Drug delivery
- Pigments & inks
- Environmental studies
- Abrasives & slurries
- Fine chemicals
- Shelf-life optimisation

### Performance

- Fully resolved overlapping Particle Size Distributions for mixtures containing different particle materials
- Number concentration of each particle type characterised
- High resolution particle size across a wide range (0.1 to 20 microns)
  10% 20% resolution (>70nm for metals)
- Particle composition & particle agglomerations identification
- Characterise internal particle loading & external particle coating
- ✓ Real time statistical analysis & customisable system tailored to application
- ✓ Fast measurements (typically done in minutes) or continuous mode

## **Dynamic Light Scattering**

The **NANO-Flex** is a **Dynamic Light Scattering (DLS) system** for measuring particle size distribution via a unique 180-degree heterodyne 'dip-in' probe for in situ measurements.

Colloids and dispersions are characterised effectively due to the high signal-to-noise ratio compared with conventional homodyne systems, as well as the 180 degree design, which eliminates the issue of multiple scattering.

The NANO-Flex can be combined with the Stabino for **simultaneous analysis of zeta potential and size distribution**.



The measuring principle of the NANO-Flex. The unique 180 degree back-scattering 'dipin probe' design eliminates the problem of multiple-scattering and allows convenient in situ measurements of particle size distribution.

### **Key Applications**

- Organic/aqueous based dispersions
- Formulation production (in-line)
- Ceramics
- Polymers
- Pharmaceuticals
- Proteins



The NANO-Flex can be combined with the Stabino zeta potential instrument to create a 'DUO-S' system, measuring zeta potential and its inherent relationship to particle size. This example shows how particles become less stable and agglomerate as zeta potential diminishes.

#### Performance

- 180 degree 'probe' design in situ formulation measurement, without multiple-scattering of conventional DLS
- In-line measurements IPAS accessory allows size measurements inline or during mixing
- High signal-to-noise ratio heterodyne design amplifies the signal by providing reference light to the detector



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