

## Light Scattering and Z-Potential

**Category:**

C. Particle Characterisation in and ex-situ

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### Short technology description/Overview:

The Zetasizer Nano ZS90 (Malvern Instruments Ltd) incorporates three techniques in a single compact unit.

**Dynamic Light Scattering** at a 90 degree angle is used to measure particle size and molecule size. This technique measures the diffusion of particles moving under Brownian motion, and converts this to size and a size distribution using the Stokes-Einstein relationship.

**Static Light Scattering** is used to determine the molecular weight of proteins and polymers. In this technique, the scattering intensity of a number of concentrations of the sample is measured, and used to construct a Debye plot. From this the average molecular weight and second virial coefficient can be calculated.

**Laser Doppler Micro-electrophoresis** is the technique used to measure zeta potential. An electric field is applied to a solution of molecules or a dispersion of particles, which will then move with a velocity related to their zeta potential. This enables the calculation of electrophoretic mobility, and from this the zeta potential for the accurate measurement of a wide range of sample types and dispersion media including high salt concentrations and non-aqueous dispersants.

### Main Features (Equipment Capabilities):

- **Particle size and molecular size:**
  - Measurement range: 0.3nm – 5.0 microns\* (diameter) using 90 degree scattering optics
  - Measurement principle: Dynamic Light Scattering
  - Minimum sample volume: 20µL
  - Accuracy: Better than +/-2% on NIST traceable latex standards
  - Precision/Repeatability Better than +/-2% on NIST traceable latex standards
- **Zeta potential:**
  - Measurement range: 3.8nm – 100 microns\*
  - Measurement principle: Electrophoretic Light Scattering
  - Minimum sample volume: 150µL
  - Accuracy: 0.12µm.cm/V.s for aqueous systems using NIST SRM1980 standard reference material
- The MPT-2 Autotitrator enables the study of the effect of changes in pH, conductivity, or any additive to be automated.
- Glass cell and Dip cell for measurements in organic solvents

### Typical Samples & Images:



**• Cells:**

For DLS: 12mm square glass cell

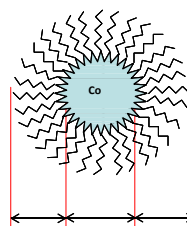


For z-potential: Dip Cell kit

-Electrode assembly with Palladium electrodes with 2mm spacing.



- Glass cell



Inorganic core: Cobalt  
 Organic layer: Oleic Acid  
 Solvent: Dichlorobenzene

Any further Information: <http://www.malvern.com/?gclid=CMqc3lr006kCFQQKfAodO2rOCA>