Particle Analysis at the Touch of a Button

Anton Paar

Litesizer™
series



Particle systems can be complex …

The size and stability of nanoparticles and microparticles are crucial to their function, as well as to their processing and transport properties.

Anton Paar, a leading developer and manufacturer of high-performance analytical instruments, has combined its physics and engineering expertise with modern software creativity to create intuitive particle analyzers that are a joy to use:

The Litesizer™ particle analyzers measure particle size, zeta potential, molecular mass and transmittance by light-scattering technology with ingeniously simple software.

Litesizer™ 100

With the Litesizer™ 100 you can determine the particle size and transmittance on a wide variety of samples. It gives you rapid and accurate insight into your particle systems, and provides the tools for optimizing them by revealing how they change with time, pH, temperature and concentration.

Litesizer™ 500

The Litesizer™ 500 does all of the above, but also measures zeta potential. The unique omega-shaped cuvette for zeta potential combined with patented cmPALS technology (European Patent 2 735 870) guarantees fast, stable and reproducible zeta potential measurements, even on sensitive and turbid samples. In addition, the Litesizer™ 500 offers a choice of scattering angle, which gives you the optimal measurement conditions whether the sample is concentrated or dilute.



Make the light choice

Litesizer™

… but **measuring them doesn't have to be**

The **Litesizer™ particle analyzers** will free up your time to concentrate on what your particles are doing, rather than trying to figure out how to use the instrument.



See everything on one page

All input parameters, measurements and analyses are presented on a single page.



Keep track of your samples

The Litesizer™ software provides customizable reports that can be generated in a few seconds and passed on for signing, either electronically or by hand. In addition, a pharma option is included, with data security functions, user management and audit trails, making it fully compliant with the US FDA's 21 CFR Part 11.



Save time

Short start-up times, a one-page workflow, intelligent measurement series, automatic measurement modes, and the fastest zeta potential measurements: The Litesizer™ saves you time.



See what your particles are doing

A series of measurements lets you see how your particles change with time, temperature, pH or concentration. Results are clearly displayed in different colors so that trends can be identified, while all important values and parameters are logically tabulated below.

Technical highlights

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Optical bench

The optical bench is the strong heart of the Litesizer™ series. Highly sensitive measurement optics enable the accurate detection of even low-intensity signals, while the robust casing reduces the effects of vibrations and ensures that measurements remain unaffected by dust or temperature fluctuations.

Litesizer™ 500

Patented ELS technology: cmPALS

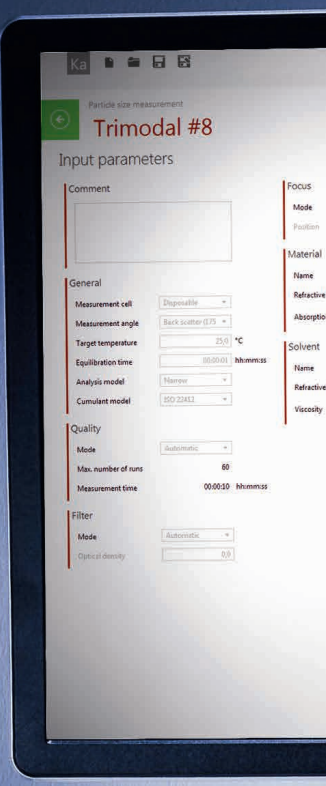
The Litesizer™ 500 uses cmPALS, a novel patented PALS technology (European Patent 2 735 870) that defines a new state of the art in ELS optics. The result: zeta potential measurements with the highest accuracy and shortest measurement time.

Litesizer™ 500

The Omega cuvette

The zeta-potential cell has an inverted Ω-shaped capillary tube. This facilitates a homogeneous electric field within the measuring channel, guaranteeing stable and reproducible results.









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Continuous transmittance measurements

Continuously measuring sample transmittance allows the device to automatically adjust parameters like focus position, measurement angle, and measurement duration.

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Unprecedented size resolution with DLS

The Litesizer™ particle analyzers can precisely resolve bimodal and even trimodal particle mixtures.

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One instrument – three detection angles

Choose from back-, side- and forward scattering, or let the Litesizer™ 500 select the best angle for your sample.

General specifications:

Temp. control range	0 °C to 90 °C
Light source	Semiconductor laser / 40 mW, 658 nm
Operating temp.	10 °C to 35 °C
Humidity	35 % to 80 % non-condensing
Dimensions (WxDxH)	460 mm x 485 mm x 135 mm
Weight	approx. 18 kg (40 lbs)

Measurement principles

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Particle size measured by DLS

Particles suspended in a liquid are constantly undergoing random motion, and the size of the particles directly affects their speed. Smaller particles move faster than larger ones. In DLS, light passes through the sample, and the scattered light is detected and recorded at a certain angle. The time dependence of the scattered intensity reveals how fast the particles are moving. From this information, it is possible to calculate the average size of the particles as well as the size distribution.

Your benefit:

The Litesizer™ particle analyzers give you accurate and precise size measurements. You can also easily measure the effect of time, pH, temperature and concentration on the particle size. The Litesizer™ provides highly developed measurement algorithms which allow you to resolve several different particle sizes in a single suspension.

Particle size specifications	
Measuring range	0.3 nm to 10 µm*
Sensitivity	0.1 mg/mL (lysozyme)
Max. sample concentration	40 % w/v
Accuracy	Better than ±2 % on NIST traceable standards
Repeatability	Better than ±2 % on NIST traceable standards
Min. sample volume	12 µL
Measurement angles	175° (Litesizer™ 100) 15°, 90°, 175° (Litesizer™ 500)

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Molecular mass measured by SLS

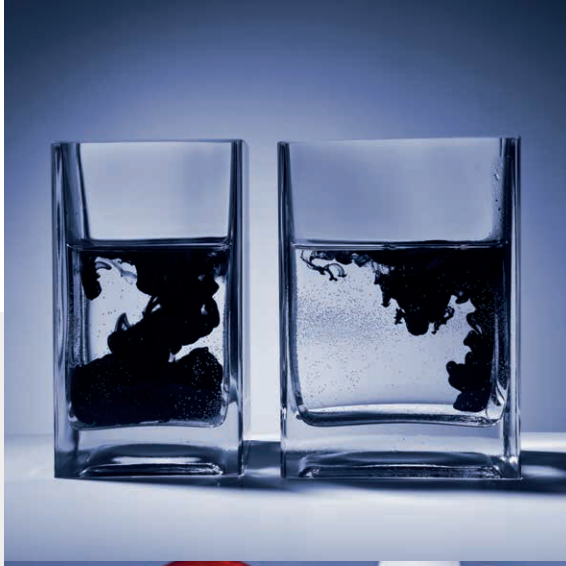
The intensity of the scattered light is directly related to molecular mass. If the scattering intensity is measured at several different concentrations, then a Debye plot can be generated, the intercept of which provides the molecular weight.

Your benefit:

SLS measurements are simple, fast and non-invasive. They also give you the second virial coefficient, which reflects protein solubility.

Molecular mass specifications	
Measuring range	980 Da to 20 MDa
Sensitivity	0.1 mg/mL (lysozyme)
Repeatability	±5 %
Measurement angle	90°

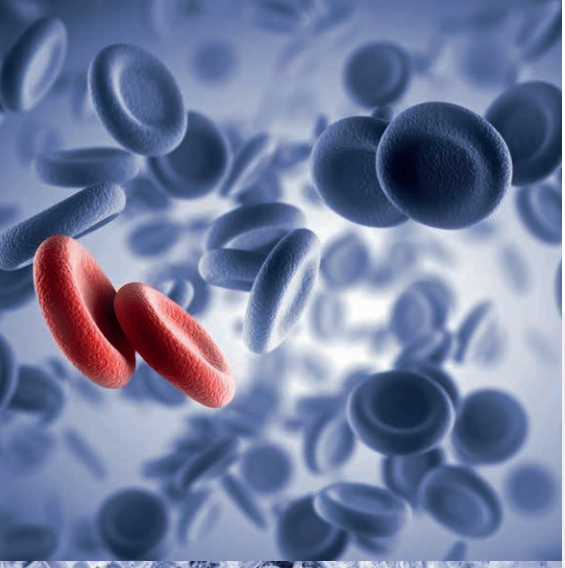
* under laboratory conditions

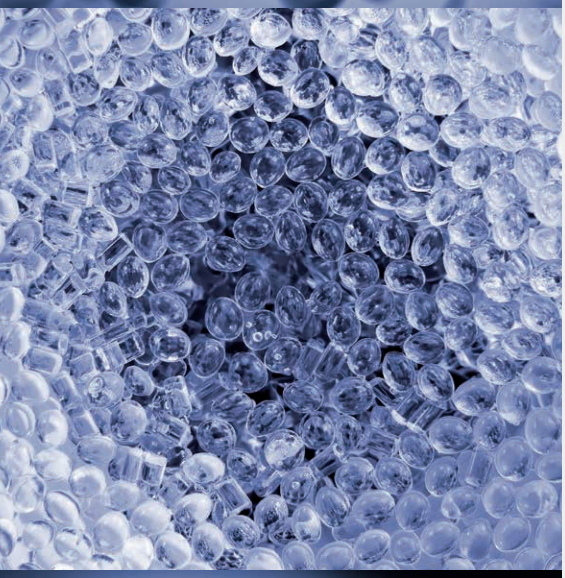
















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Zeta potential measured by ELS

In electrophoretic light scattering (ELS) the speed of the particles is measured in the presence of an electric field. The faster the particles move, the higher the zeta potential of the particles. In general, a greater-magnitude zeta potential means that the particles will repel each other more strongly, giving a more stable suspension.

Your benefit:

The Litesizer™ 500 uses a patented (European Patent 2 735 870) technology called cmPALS. This is a significant advance on existing PALS technology because it allows the modulator to make large movements. This means you can use shorter measurements and apply lower electric fields, reducing the effects of electrode fouling and deterioration.

Zeta potential specifications	
Measuring range	-600 mV to +600 mV
Size range	3.8 nm to 100 µm
Sensitivity	1 mg/mL (lysozyme)
Max. sample concentration	40 % w/v
Sample volume	350 µL
Max. sample conductivity	200 mS/cm
Measurement angles	15°

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Transmittance

Transmittance is measured by detecting the fraction of light that passes through the sample. The Litesizer™ particle analyzers continuously measure the transmittance for every sample. The value is reported in real time and is displayed during operation.

Your benefit:

You obtain instant insight into the suitability of the sample for light-scattering measurements. In addition, this measurement allows the Litesizer™ to select the best parameters for your sample (focus position, measuring angle, measurement duration).

Transmittance specifications	
Measuring time	10 s
Min. sample volume	15 µL

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