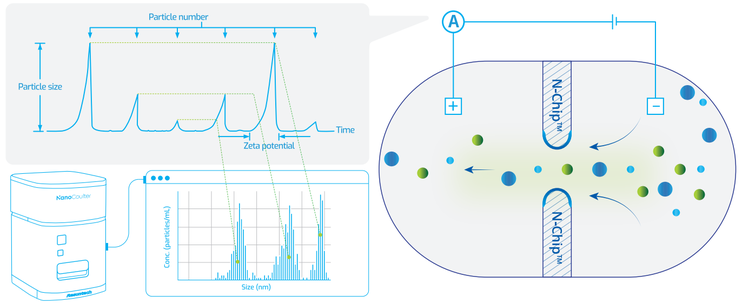
NanoCoulter™

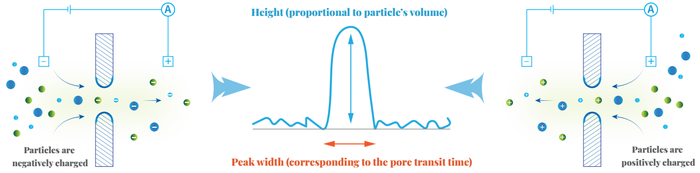
Resistive Pulse Sensing (RPS) Principle

NanoCoulter™ utilizes the resistive pulse sensing (RPS) principle, also known as the Coulter principle. When the voltage is applied in the electrolyte, as individual particles traverse the nano-aperture of the NanoCoulter™ N-Chip™, a transient change in electrical resistance is generated, forming a resistive pulse. These resistive pulses are accurately analyzed by NanoCoulter™ to yield multi-dimensional data, including particle size and Zeta potential.



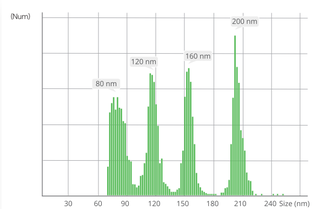
Potential Detection Principle (Electrophoresis Method)

When particles are subjected only to the electric field force, their electrophoretic migration velocity is proportional to their surface charge, which is quantified as the Zeta potential.
Under the action of an applied electric field, charged particles move toward the electrode of opposite charge, and their migration velocity is related to the magnitude of the Zeta potential.

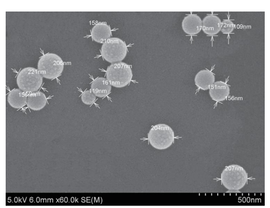


Electron Microscopy-Comparable Particle Size Determination

NanoCoulter™ measures both the particle size and size distribution of polydisperse samples, delivering EM-consistent results with exceptional accuracy and precision.



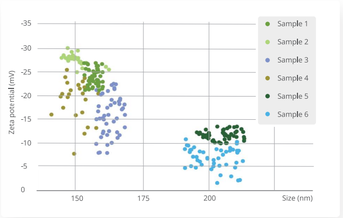
Particle Size Data Measured by NanoCoulter™

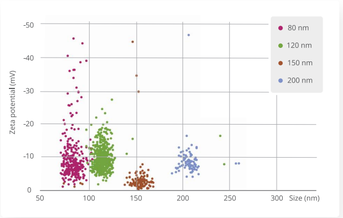


Electron microscopy results for the same sample

Single-Particle Zeta Potential Measurement

Zeta potential is an important indicator of the stability of dispersion systems. Under a constant electric field, the electrophoretic velocity of particles is directly proportional to the absolute value of their zeta potential. NanoCoulter™ measures the time it takes for particles to pass through a nanopore to obtain Zeta potential data, making it the only technology platform capable of simultaneously measuring single-particle size, Zeta potential, and concentration.

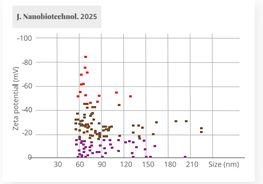


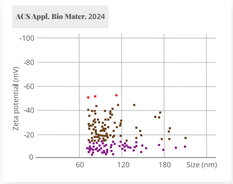


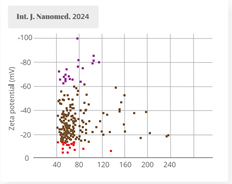
APPLICATIONS

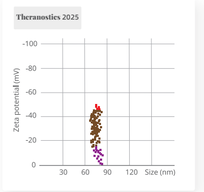
EV Zeta Potential Characterization

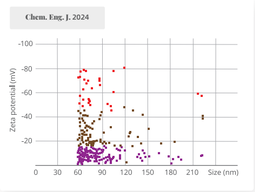
Zeta potential is a key parameter for evaluating EV stability, surface charge characteristics, and in vivo interactions. It directly influences adsorption, targeted delivery, and circulation time within biological systems. Traditional optical methods (DLS/L-NT),
can only provide an ensemble-averaged potential, failing to capture sample heterogeneity. NanoCoulter™ enables single-particle Zeta potential measurement, offering precise insights into EV population heterogeneity, thereby advancing research and applications in EV-based therapeutics.

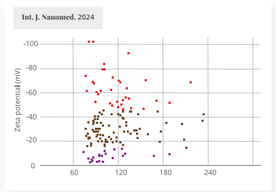






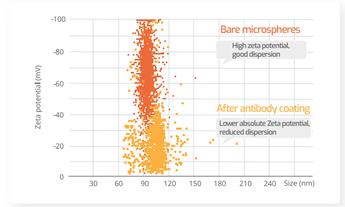


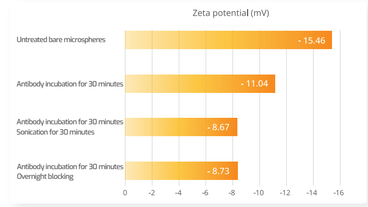




Characterization of Microsphere Modification Process

Perform precise particle size and surface charge analysis on latex microspheres before and after antibody coating to intuitively reveal the aggregation status. This provides reliable data support for optimizing the coating process and dispersion treatment, thereby enhancing the stability of downstream experiments.



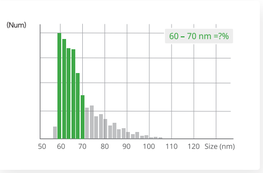


APPLICATIONS

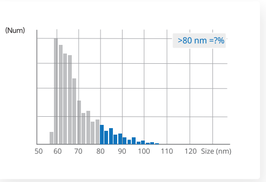
Liposome/LNP

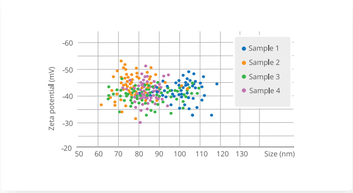
LNP Particle Size Distribution and Zeta Potential Analysis

Particle size and size distribution are among the key Critical Quality Attributes (CQAs) parameters for LNPs. LNPs prepared by different methods may exhibit different size distributions, which are often overlooked by DLS measurements. The NanoCoulter™ can resolve the size distribution of LNP particle populations, supports "customizable" statistical analysis of particle fractions within defined size ranges, and establishes a correlation between the size and Zeta potential of individual nanoparticles.



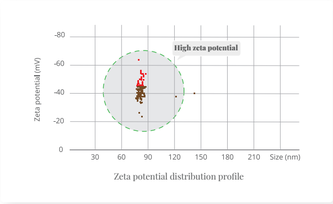
60 nm – 70 nm		> 80 nm	
Size	%	Size	%
64	61.2%	84	5.2%

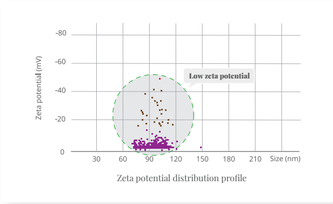




Quality Control for Lot-to-Lot Variability of Viruses.

Real-time monitoring of particle size and Zeta potential distribution for lentivirus, adenovirus, etc., enables precise assessment of batch-to-batch differences. This provides efficient support for process optimization and adjustment of production parameters, helping to improve viral production efficiency and stability.





NanoCoulter™ Particle Analyzer		Technical Specifications
Model		NanoCoulter Deft
Principle		Resistive Pulse Sensing (RPS)
Channel		Dual-channel
Particle Size	Range	50 - 2000 nm
	Accuracy	100% ± 6%
	Precision	CV < 3%
Zeta Potential	Range	± 100 mV
	Accuracy	± 3 mV
	Precision	CV < 5%
Testing Time Per Sample		2-3 (up to 15) min
Volume Per Sample		200 µL after dilution
Operating System		Windows 7+ Pro/Ent
GMP/GLP Management		IQ/OQ Option/FDA 21 CFR Part 11 Option
Dimensions (W x D x H)		28.5 cm x 35 cm x 45 cm
Weight		17.3 kg

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