

SIOS

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NANOPARTICLE ANALYSIS TECHNOLOGY

Welcome to the next generation of fluid-borne particle analysis with Izon's SIOS technology platform.

SIOS (Scanning Ion Occlusion Sensing) is a highly precise analytical nanotechnology platform for detecting, measuring and controlling nano- and micro-particles (50nm to 10 microns).

Background:

Particles are driven through a sensing pore for detailed analysis. The geometry of the pore is tunable enabling accurate and sensitive measurements.

When a particle passes through the nanopore, it generates a resistive peak that provides information about the particle.

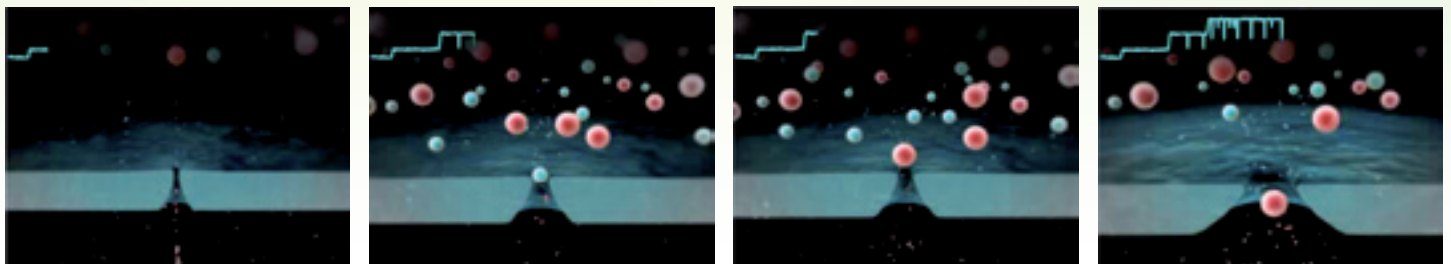
Each individual signal contains information about particle size, surface charge, shape and the concentration of particles in the sample. This information can therefore be determined simultaneously during one experiment.

Resistive pulse sensing with fixed geometry micro-scale pores has been used for industrial type applications since its development by W.H. Coulter in the 1950s.

Izon's SIOS platform advances this concept a quantum leap by having a patented, unique, adjustable pore that is able to resolve polydispersed particles from the micro- to the nanometer size range.

This unique approach to resistive pulse sensing enables real-time dynamics of particles in solution to be quantified. Furthermore, it offers the ability to finely control the balance of applied electrical voltage and pressure to quantify electrophoretic mobility, diffusion and aggregation kinetics.

- Real-time particle detection, analysis and control
- Quantifying aggregation levels
- Single Particle Resolution
- Determining size, charge, concentration
- Robust, portable, cost-effective technology



Time sequence example of nano-sized particles travelling through a tunable nanopore. The SIOS system detects a signal from each particle, building up whole population data for analysis. To view the full animation visit: www.izon.com

Sample Types

Particle composition: Any synthetic or biological particle with a net surface charge (positive or negative), uncharged particles
Examples:

- Silica
- Polystyrene
- Magnetic
- Metallic
- Polymers
- Exosomes
- Liposomes
- Bacteria
- Viruses
- ... and any more

Particle size: 50nm–10µm+

Concentration range: ~10⁵–10¹² particles per mL

Fluid composition: requires samples in an electrolyte solution. Some solvents may not be suitable. Please contact us for further advice (E-mail: info@izon.com).

If your sample of interest is not listed here, please contact us for more information (info@izon.com).

Applications

SIOS provides a practical platform solution for a wide variety of nano-analysis challenges:

Particle sizing

SIOS provides a particle-by-particle measurement solution for accurate size distribution analysis of particle populations.

Applications include:

- Absolute sizing
- Size distribution analysis
- Volume fraction analysis
- Resolution of multiple populations
- Aggregation analysis

Particle-by-particle measurement ensures accurate, representative measurement of polydisperse samples and resolution of multiple populations.

Concentration analysis

(measurement range $\sim 10^5$ - 10^{12} particles per mL)

SIOS instrumentation provides a state of the art solution for measuring particle concentrations in both biological and synthetic particle samples. Concentration analysis of nano-sized particles using SIOS provides a solution that is rapid, accurate, reproducible and cost effective. An intuitive software interface provides simple, guided measurement.

Particle interaction monitoring

SIOS allows identification and analysis of particle-particle, particle-biomolecule and aggregation interactions.

Study of particle functionalisation, synthetic nanoparticle production, vaccine process development as well as diagnostic applications are aided by:

- Binding interaction confirmation
- Real-time monitoring
- *In situ* reaction capability
- Sample comparison and QC measurements
- Small molecule detection and diagnostic capability

Software

The Izon Control Suite software provides a comprehensive interface to the SIOS platform for both data acquisition and particle analysis.

The latest version (Version 2.0) includes significant functionality in a number of areas:

Integrated size and concentration measurements of single or multiple particle samples. Absolute sizing and concentration are obtained by calibration of the nanopore, with accurate standards, at the time of measurement.

For further enquiries please contact us at sales@izon.com

Izon is continually developing and advancing its technology.

For the latest information about new developments and upgrades please visit us at www.izon.com

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Greater accuracy achieved through a sophisticated multi-pass algorithm which automatically detects particles transiting the nanopore, enhanced particle analysis, standard operating procedures and advanced data filtering.

Simplified user interface incorporating step-by-step instructions for performing standardised particle measurement.

A comprehensive set of analysis and reporting tools is incorporated in the software, including: charting tools to view translocation traces, histograms and scatter plots of single or multiple data sets, flexible filters to include or exclude single or multiple particles from analyses, detailed statistics on each data set, full reporting and ability to export data, statistics and charts.

Nanopores

Fundamental research into nanopores and nano/microfluidic systems

The SIOS platform combined with Izon's unique tunable nanopore technology opens up new frontiers for scientific investigation. As the world's first commercially available nanopore system SIOS provides an accessible platform upon which to carry out fundamental research into nano/microfluidics.



Izon's nanopores make the SIOS platform tuneable and dynamic. Nanopores are robust and easy to handle. They can be used repeatedly, cleaned and re-used, or simply disposed of after one use depending upon the nature of work being undertaken.

When fitted to the qNano or qViro instruments, nanopores can be stretched evenly along the x and y axes, resulting in nanometre scale adjustments to the aperture.

Nanopores can be made according to the particle size range required. They are carefully tested to ensure that optimal performance range is characterised before being supplied to the customer.

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