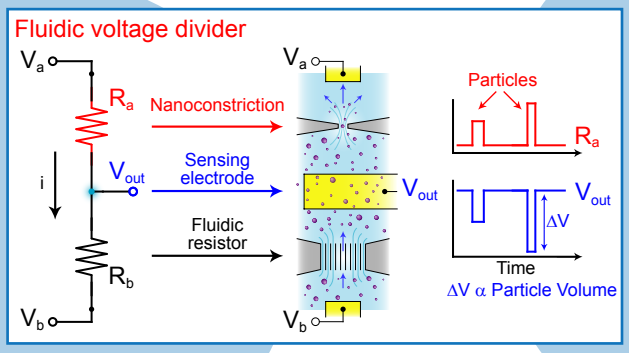
Spectradyne®
Particle Analysis

Nanoparticle Measurements of Arbitrarily Polydisperse Mixtures

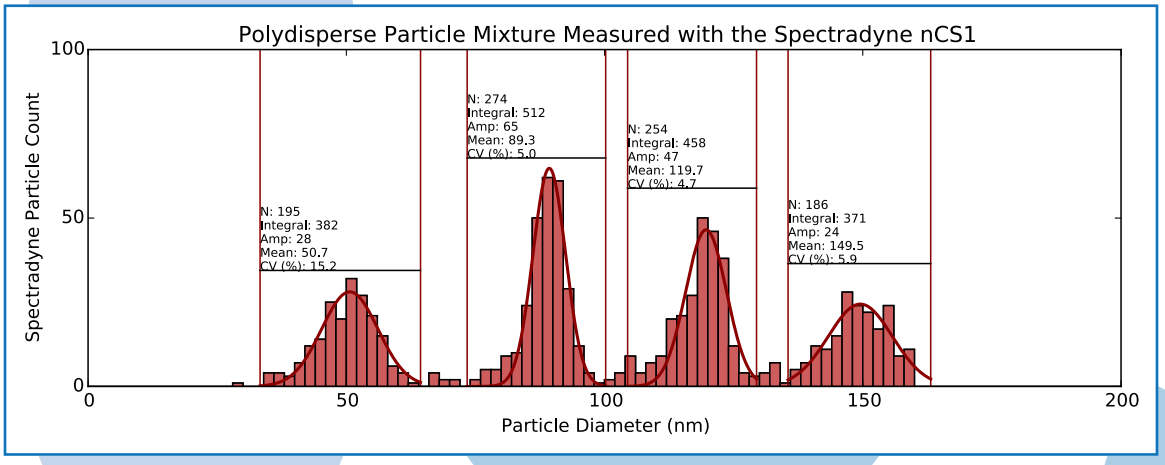
A polydisperse particle mixture is one in which the constituent particles vary in size, shape, or molecular weight. The size distribution in such mixtures can be difficult to ascertain; bulk optical properties of the mixture, such as opacity, do not give detailed information about the population distribution. This is especially true as particle sizes decrease into the deep sub-micron range.

The details of a nanoparticle population can contain critical information. For example, aggregation phenomena can lead to the failure of otherwise effective biopharmaceutical formulations. Properties of synthetic nanoparticles are often heavily dependent on the size of the nanoparticles. Therefore, quality control of novel nanotechnology-enabled materials relies on the ability to make high resolution measurements of nanoparticle mixtures.

Spectradyne's technology is based on resistive pulse sensing, a technique in which particles suspended in fluid are detected one-by-one, by electrical means, as they pass through a constriction. A schematic representation is shown at right; more information can be found in Reference 1. By individually measuring each particle, Spectradyne's nCS1 instrument reports the details of complex nanoparticle mixtures in high resolution.



Spectradyne's technology requires the suspending fluid is at least weakly conducting (10 mM NaCl is sufficient), with particle concentrations from 10^7 to 10^{12} particles/mL. Particles can be made of any material: the technology works for conducting as well as insulating particles and does not depend on e.g. the index of refraction of the particles.



Measurement of a four-component mixture of polystyrene beads, ranging from 50 nm to 150 nm in diameter.

Spectradyne's nCS1 provides accurate, high-resolution particle size and concentration distributions for particles of all material types. For more information or to arrange a demonstration of the technology, please visit our website or contact us by email.

1. Fraikin, J-L., Teesalu, T., McKenney, C. M., Ruoslahti, E., Cleland, A. N. "A high-throughput label-free nanoparticle analyser". *Nature Nanotechnology* **6**, 308-313 (2011).