

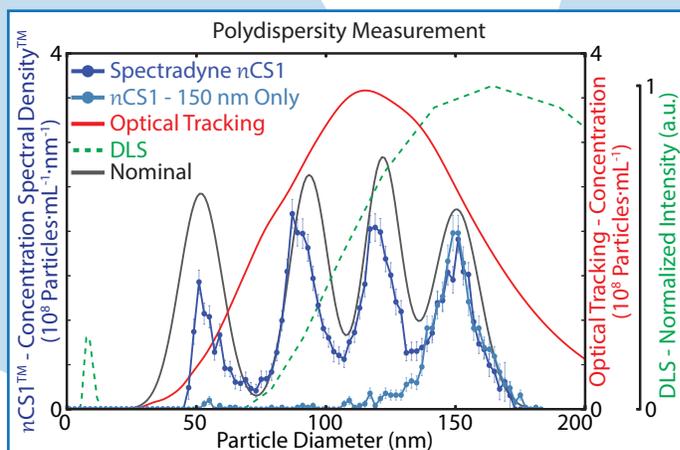
A Head-To-Head Comparison—Spectradyn^e's nCS1™ vs Optical Tracking and Dynamic Light Scattering

The Spectradyn^e nCS1 is the only bench top nanoparticle sizing technology that provides high-resolution size distributions and accurate concentration measurements for particles in the 50 - 2000 nm diameter size range. The technology employs a novel implementation of the resistive pulse sensing method to rapidly count and size individual nanoparticles in a sample, with typical precision of a few percent in both size and concentration. As a result, the nCS1 delivers unprecedented capabilities for analyzing complex polydisperse samples. In addition, because particles are measured electrically in the nCS1, not optically, particles of all materials are measured equally well, including biological particles that have an index of refraction similar to their suspension medium.

Here we describe a direct head-to-head comparison between the Spectradyn^e nCS1, single-particle optical tracking, and dynamic light scattering (DLS). Two different samples were prepared and sent to an independent, commercial measurement facility for analysis by optical tracking and DLS, and a small aliquot of each sample was reserved and measured on the nCS1.

1. Polydisperse nanoparticle mixture.

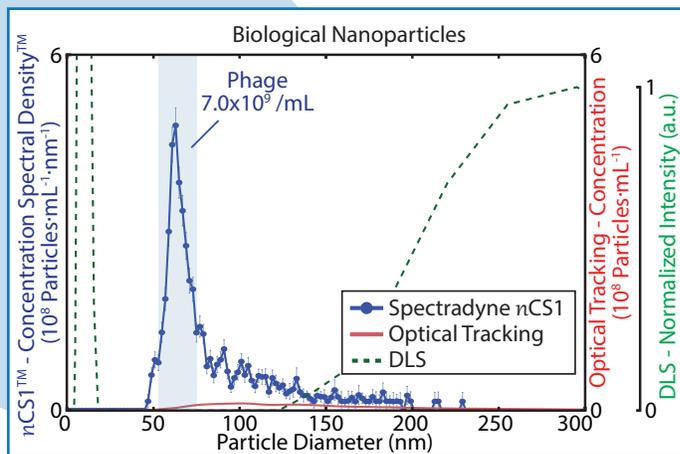
Nanoparticle suspensions having NIST-certified mean diameters 52, 94, 122 & 150 nm (Polysciences, Inc.) were mixed together to equal nominal final concentrations of 5×10^9 particles/mL. Results of the analysis of the mixture by the three different techniques is shown at right, with the expected nominal distribution indicated by a solid gray line. **Spectradyn^e's nCS1 clearly resolves the four components of the mixture** and yields concentration measurements for each sub-population within $\sim 30\%$ of the nominal estimates given by the manufacturer. **Neither optical tracking nor DLS are able to measure the true composition of the sample.**



Optical tracking reports a total particle concentration nearly 3 times greater.

2. Biological Nanoparticles.

A preparation of bacteriophage was analyzed with the three different methods (right). **Spectradyn^e's nCS1 accurately quantifies the phage** (peak diameter 62 nm, concentration 7.0×10^9 particles/mL), and reveals a distribution of larger particles in the sample that likely include remnants of the cell culture process used in manufacturing. **Neither optical tracking nor DLS are capable of detecting the phage particles.** The nCS1 is the only instrument that delivers an accurate measurement of the true size distribution in the sample.



Spectradyn^e'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.