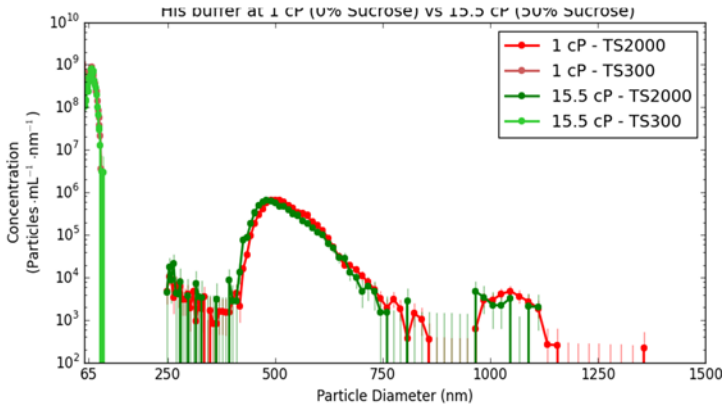
Nanoparticle Measurements Unaffected by Sample Viscosity

The Spectradyne nCS1™ employs a novel implementation of the resistive pulse sensing (RPS) method to count and size nanoparticles quickly and with high resolution. Sizing precision of ±3% is typically achieved, with measurement rates up to 10,000 particles/s. The RPS method offers a unique method for the measurement of nanoparticle size and concentration, one that is **independent** of sample viscosity. This is in direct contrast to methods that use optical techniques, such as dynamic light scattering and nanoparticle tracking analysis, where the sample viscosity must be known before interpreting the results.

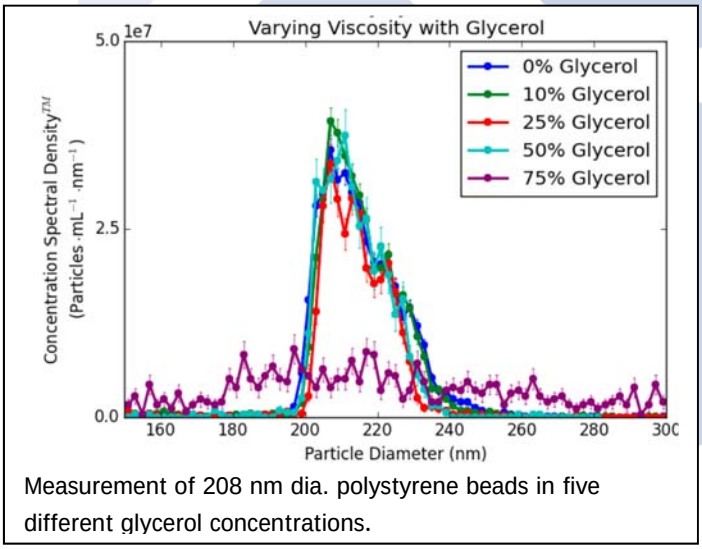


Particle concentration vs. particle diameter, for a set of three bead diameters (50, 500 and 1000 nm), measured in two different sucrose concentrations. The measurements overlay exactly, showing the independence of nCS1's RPS measurement method to viscosity.

We demonstrate this with two separate measurements in different viscosity solutions. First, as shown in the plot on the right, we show the results when measuring a mixture of three different polystyrene beads (50nm, 500nm and 1000nm) in solutions with two different amounts of sucrose. One measurement is in a solution with no sucrose, with a viscosity of 1 cP (1 mPa), with the results overlaid with measurement in a solution of 50% sucrose (viscosity of 15 cP).

Next we demonstrate the results when measuring 208nm diameter polystyrene beads in different concentrations of glycerol. The solution was standard unit concentration phosphate-buffered saline, with glycerol concentrations ranging from 0% up to 75%. The corresponding viscosities are displayed in the table. In each measurement, the nCS1 was able to detect particles, with the results for 0% to 50% glycerol solutions in excellent correspondence, with the particle diameter and concentration as expected from the solution makeup. At 75% glycerol, the nCS1 still reported particles in the right size range, but at much reduced concentration; examination of this solution indicated that likely the particles were agglomerating and thus being taken out of the size range reported in this measurement.

% glycerol	Viscosity (cP)
0%	1
10%	1.3
25%	2.4
50%	8.4
75%	55.5



Measurement of 208 nm dia. polystyrene beads in five different glycerol concentrations.

In summary, the nCS1's unique implementation of microfluidics-based resistive pulse sensing demonstrates independence from sample viscosity, reporting consistent and high resolution measurements of particle size and concentration *independent* of the solution viscosity. Measurements can thus be made in varying levels of e.g. sucrose and glycerol with affecting the measured particle size distributions.

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