Analysis of nanoparticles on particle-by-particle basis using Tunable Resistive Pulse Sensing (TRPS) technology

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Precise measurements, with particle-by-particle detail, of a range of engineered and biological particles, i.e., liposomes, polymers, viruses and protein-conjugates will be described. Particles are transported through a flexible pore via electric field and/or with pressure, for rapid and detailed determination of particle concentration (particles/mL), accurate size, aggregation levels, size distribution and zeta-potential distribution, all determined simultaneously.

Experimental parameters are adjusted in real-time for mapping how different populations within particle mixtures respond to externally applied conditions for high-resolution and powerful analysis of particle physical properties and its dynamic behavior, i.e., to assess the level of surface modification such as PEG-lyation.

The ability to individually interrogate each particle addresses the shortcomings of ensemble systems such as dynamic light-scattering and also of static systems using electron microscopy. This also enables the quantification of the dynamic behavior of particle mixtures, such as: Aggregation and fragmentation of particles and surface modification changes to particles. Research work utilizing tunable pore sensor in particle quantification, particle interaction dynamics and drug delivery systems will be presented.

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