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

Subhash Kalluri
IZON Inc., USA

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.

bhargava.kalluri@izon.com