

TITLE

Analysis of micro and nano-sized particles with a tunable nanopore sensor for the precise engineering of drug delivery systems for nanomedicine applications

Hans van der Voorn

Izon Science Ltd, USA

Precise measurements, with particle-by-particle detail, of a range of engineered and biological particles, i.e. liposomes, PLGA, lipids, micelles, virus-like-particles, polymers, viruses, bacteria, protein-conjugates, exosomes, vesicles 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 for dosage), accurate size, aggregation levels, size distribution and relative surface charge 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 their dynamic behaviour, i.e. to assess the level of surface modification (PEG-lyation) of drug delivery carriers.

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 behaviour of particle mixtures, such as aggregation/fragmentation of particles, and surface modification changes to particles. Research work utilizing tunable pore sensors in virus quantification, pathogen interaction dynamics, medical diagnostics and drug delivery systems are presented.

Biography

Hans van der Voorn is an experienced engineer and entrepreneur now wholly focused on Izon Science. He originally trained as an engineer in New Zealand and worked in civil engineering and construction for 15 years. In 2007, he took over executive management of Izon, while the founder scientists continued to work on research and development. He has developed Izon's commercialization and sales strategy and is also the inventor on one of Izon's series of patent applications. He travels frequently on behalf of Izon, is a regular speaker at conferences and investment forums and a regular commentator on entrepreneurship and science commercialization.