

Media Backgrounder – perspective and detail for journalists:

AGILENT TECHNOLOGIES IN PARTICLE ANALYSIS



Agilent Technologies is a new entrant in the growing market of particle analysis tools. Agilent offers a full portfolio of particle size, concentration, and zeta potential measurement techniques over a wide range of particle sizes and concentrations. Agilent's customers range from global pharmaceutical corporations to chemical companies, government labs and academic researchers.

Agilent tools help nanotechnologists to make better measurements, faster. Understanding nanoparticle size is critical for tuning the properties of a wide variety of materials – from tailoring drug uptake in the body to maximizing transparency and hardness of a paint coating. The stability of these particulates in solution depends as well on the electrical charge present on the surface of the particles, known as zeta potential. Measurement and control of zeta potential

allows scientists to formulate stable dispersions of particles which don't aggregate over time. Agilent provides products throughout the entire range from basic research to manufacturing quality control.

PARTICLE ANALYSIS MARKETS

Agilent's particle analysis business addresses the needs of five key markets: polymers, inks & pigments, specialty chemicals, food/personal care, and pharmaceuticals.



The **Polymers** industry formulates dispersions for many applications including paper coatings, paints, adhesives, and carpet backings. The properties and performance of these products are largely determined by their particle size distribution. Agilent provides methods for determining the particle size and particle concentration of these dispersions.



Inks and pigments are formulated as particles which are frequently deposited through ink-jet printing. The mean particle size is critical to the printing behavior as well as detecting the presence of large particle aggregates which can clog print heads. Formulation stability is of key importance and zeta potential measurements are instrumental in developing stable dispersions.



Specialty Chemicals spans a wide range of applications including metal powders, slurries for chemomechanical polishing of semiconductor wafers, catalysts, and a wide variety of additives. Agilent's particle sizing products allow researchers to develop particles with precisely tailored size distributions and controlled surface charge for performance and long-term stability.



Food and personal care products are often made of emulsions – for example fat particles in milk – or dispersions – for example silicon dioxide particles in toothpaste. The properties of these products often depend on particle size and zeta potential – for example, the UV-protecting properties of sunscreen depend on the size of titania nanoparticles therein and the long-term stability of the formulation.



Agilent is a market leader in **pharmaceutical analysis** tools, including drug development and QA/QC. Agilent provides particle size tools for measurement of small molecule drug suspensions, protein aggregation and agglomeration, liposomes, and intravenous emulsions. Agilent provides instrumentation, consumables, data systems and compliance services designed to help labs increase throughput, generate high quality data and accommodate regulatory requirements.

PRODUCT CATEGORIES

Agilent offers five key technologies for particle analysis: Particle Sizing Spectrophotometry, Electroacoustic Zeta Potential, Dynamic Light Scattering, Single Particle Optical Scattering, and Atomic Force Microscopy. For each of these technology areas, Agilent also provides consumables, services and customer support.



Particle Sizing Spectrophotometry uses the Mie scattering spectra of particles in fluid or aerosols to determine the particle size distribution and concentration of particles. The technique measures particle size distributions in seconds, enabling measurements of colloidal kinetics and stability. Its ease of use and repeatability make it ideal for quality control applications.



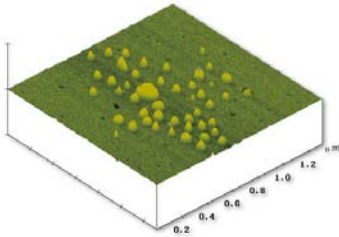
Electroacoustic Zeta Potential is a method of measuring the charge of particles in solutions – an important measure of formulation stability. The method is one of the most important tools for the specialty chemical and inks/pigments industries because of its ability to measure in highly concentrated samples with no dilution.



Dynamic Light Scattering (DLS) measures the Brownian motion of nanoparticles in solution to determine their size. This allows size measurement of the smallest nanoparticles and proteins – down to 1 nm in size. It is commonly combined with electrophoretic zeta potential measurement which can measure the charge on more dilute particles in solution – for example charge on viruses and liposomes.



Single Particle Optical Sizing (SPOS) measures the extinction and scattering of laser light by individual particles flowing past a sensor. The method of measuring individual particles and collecting statistics, instead of the ensemble techniques of Particle Sizing Spectrophotometry and Dynamic Light Scattering, give SPOS the best particle size resolution and sensitivity. This technique detects trace levels of large particles in a small particle background which can prove fatal to product performance in such diverse applications as chemomechanical polishing slurries and intravenous emulsions.



Atomic Force Microscopes are high-resolution imaging and measurement tools that allow researchers to directly view single atoms or molecules that are only a few nanometers in size, then produce a three-dimensional map of the sample's surface. AFM's superior resolution allows precise size and shape measurement of even the smallest individual nanoparticle. Agilent's intuitive Picomap software allows users to quickly analyze images to determine statistics on the size and shape of an ensemble of nanoparticles.