

Danish Nanochemistry Researchers Use Nanosight NTA to Characterize Nanoparticles

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NanoSight, leading manufacturers of unique nanoparticle characterization technology, describes how the Nano Chemistry group at DTU Copenhagen is utilizing nanoparticle tracking analysis, NTA, in its research and teaching programs.

The NanoChemistry group at the Department of Chemistry at DTU in Kongens Lyngby near Copenhagen, is led by Professor Jens Ulstrup.



Christian Engelbrekt discussing his NanoSight NTA data at DTU Chemistry.

Chemistry at the nanoscale deals with the observation and manipulation of Nature's tiniest chemical building blocks, and with the design and exploitation of new properties that arise from nanoscale objects. The NanoChemistry group at DTU Chemistry uses new and untraditional technologies which has helped us to open a whole new world of "ultra-small" chemical and physicochemical systems of great importance for future technology. One of the current projects dealing with nanoparticles in solution is the SAMENS project.

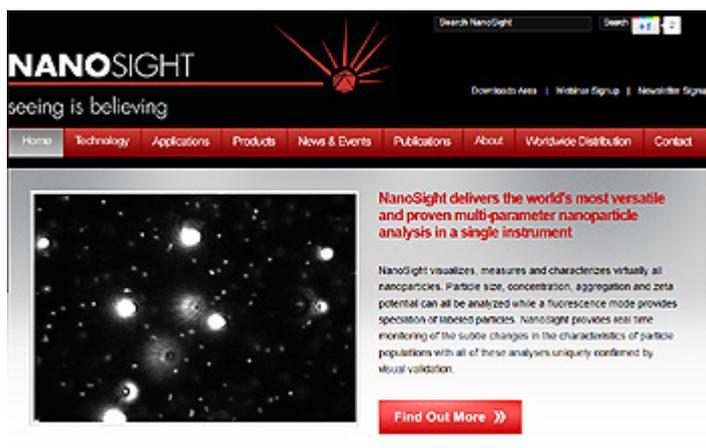
The main objective of NanoChemistry's SAMENS project (saccharide-based approach to metallic nanostructure synthesis) is to develop methods for the preparation of novel exciting nanostructures. These include very small, (i.e. less than a few nanometers) metallic and metal oxide nanoparticles, core-shell hetero-nanostructures of metals and metal oxides and highly anisotropic nanostructures. These are thoroughly characterized by a variety of methods and applied in electrochemistry and electrocatalysis. The research is built on a strong "green" foundation (i.e. harmless chemicals, aqueous environment and mild synthesis conditions) with constant efforts also within nanotoxicology. The properties of the nanostructures depend strongly on their size and shape, so it is critical that we have precise knowledge about these parameters.

Several techniques for size and shape characterization have been used in the project. These include TEM, AFM, STM, UV-Vis, SEM and Zetasizing. Most recently, a NanoSight system providing particle-by-particle nanoparticle tracking analysis, NTA, was acquired. The leading user, Christian Engelbrekt from the NanoChemistry group at DTU Chemistry, describes his thoughts on using the system for his research:

"From my experience, NTA is superior to the majority of nanoparticle characterisation techniques and complementary to others. Compared to other light-scattering techniques in solution, the NTA user is much closer to

the raw data. This provides a strong basis for analysis and interpretation of the results. This is especially important when working with hybrid and anisotropic nanostructures where very careful data analysis is needed. The other techniques are all based on dried or immobilized samples which introduces other challenges regarding interpretation. We furthermore often look at coated nanostructures and with NTA we can "see" the overall size including the coating layer which is not visible in TEM. And another advantage is that NTA is really fast and inexpensive to run."

Nanosight



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Primary Activity

Material Manufacturer

Company Background

[NanoSight](http://www.nanosight.co.uk) delivers the world's most versatile and proven multi-parameter nanoparticle analysis in a single instrument.

[NanoSight](http://www.nanosight.co.uk) visualizes, measures and characterizes virtually all nanoparticles. Particle size, concentration, Zeta potential and aggregation can all be analyzed while a fluorescence mode provides differentiation of labelled particles. NanoSight presents real time monitoring of the subtle changes in the characteristics of particle populations with all of these analyses uniquely confirmed by visual validation.

[NanoSight's](http://www.nanosight.co.uk) "Nanoparticle Tracking Analysis" (NTA) detects and visualizes populations of nanoparticles in liquids down to 10nm, dependent on material, and measures the size of each particle from direct observations of diffusion. This particle-by-particle methodology goes beyond traditional light scattering and other ensemble techniques in providing high-resolution particle size distributions. Additionally, [NanoSight](http://www.nanosight.co.uk) measures concentration and validates data with information-rich video files of the particles moving under Brownian motion.

[NanoSight's](http://www.nanosight.co.uk) comprehensive characterization matches the demands of complex biological systems, hence its wide application in development of drug delivery systems, of viral vaccines, in nanotoxicology and in biodiagnostics. This real-time data gives insight into the kinetics of protein aggregation and other time-dependent phenomena in a qualitative and quantitative manner.

[NanoSight](http://www.nanosight.co.uk) has a growing role in biodiagnostics, being proven in detection and speciation of nanovesicles (exosomes) and microvesicles. As functionalized nanoparticles increasingly fulfill their potential in biodiagnostics, [NanoSight](http://www.nanosight.co.uk) is ever more the analytical platform of choice.

[NanoSight](http://www.nanosight.co.uk) demonstrates worldwide success through rapid adoption of NTA, having installed more than 300 systems

worldwide with users including BASF, GlaxoSmithKline, Merck, Novartis, Pfizer, Proctor and Gamble, Roche and Unilever together with the most eminent universities and research institutes. In addition to this user base more than 250 third party papers citing [NanoSight](#) results consolidate [NanoSight's](#) leadership position in nanoparticle characterization.

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