



## NEWS RELEASE

### Potsdam researchers use Malvern Zetasizer Nano in gold nanoparticle research

**8 September 2009: Malvern, UK:** Researchers at the University of Potsdam, Germany, are using a Zetasizer Nano ZS from Malvern Instruments to measure the dimensions and stability of gold nanoparticles smaller than 5 nm in diameter.

Gold has long been considered as an inert element, but in nanoparticulate form it can be very reactive. For particles under 5 nm the surface electrons increasingly dominate the properties of the surface and consequently of the system. This makes gold nanoparticles interesting for life science applications, in tagging viruses and cells for example.

Sabine Kosmella and Joachim Koetz made the ultrafine nanoparticles in a one-step reaction using gold chloride and an oligosaccharide-modified hyper-branched polyethylenimine (PEI). The PEI is a polyelectrolyte that acts as a reducing agent as well as a stabilising agent. To make the particles, a mixture of gold chloride and PEI in solution is heated to 100 degC. This results in a dispersion of gold nanoparticles, which turn the solution red.

With the Zetasizer Nano the researchers were able to show that the average diameter of the particles was less than 5 nm and to determine the zeta potential of the dispersion, an indicator of its stability.

"Being able to measure particle size is important for the determination of the hydrodynamic radius of the particles including the polymer shell in comparison to other methods like TEM, visualising the particle radius without polymer shell" said Dr Kosmella.

The Zetasizer Nano ZS from Malvern Instruments enables the measurement of both particle size, from 0.6nm to 6000 nm, and zeta potential in a single instrument. The technology built into the system provides the sensitivity required for measuring dilute proteins and polymers, as well as the ability to measure emulsions and suspensions at high concentrations. It is the method of choice for nano-particle applications from routine colloid size measurements to the investigation of particulates at the leading edge of materials research. [www.malvern.com/zetasizernano](http://www.malvern.com/zetasizernano)

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**Image, notes and contact details to follow...**

High resolution image attached or available from Trish Appleton,  
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#### **About Malvern Instruments**

Malvern Instruments provides a range of complementary materials characterization tools that deliver inter-related measurements reflecting the complexities of particulates and disperse systems, nanomaterials and macromolecules. Analytical instruments from Malvern are used in the characterization of a wide variety of materials, from industrial bulk powders to nanomaterials and delicate macromolecules. A broad portfolio of innovative technologies is combined with intelligent, user-friendly software. These systems deliver industrially relevant data enabling our customers to make the connection between micro (such as particle size) and macro (bulk) material properties (rheology) and chemical composition (chemical imaging).

Particle size, particle shape, zeta potential, molecular weight, chemical composition and rheological properties measurements are now joined by advanced chromatography solutions (GPC/SEC), extending Malvern's technologies for protein molecular weight, size and aggregation measurements, and synthetic polymer molecular weight and distribution. The company's laboratory, at-line, on-line and in-line solutions are proven in sectors as diverse as cement production and pharmaceutical drug discovery.

Headquartered in Malvern, UK, Malvern Instruments has subsidiary organizations in all major European markets, North America, China, Korea and Japan, a joint venture in India, a global distributor network and applications laboratories around the world. [www.malvern.com](http://www.malvern.com)

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