

TITLE

Tailored Ag nanoparticles for surface enhanced Raman spectroscopic analysis of heme-cofactor/enzyme complexes

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For rational design of biotechnological devices a profound understanding of the molecular processes between target molecules and their reaction partners is needed. Suitable in situ analytic techniques in this field should therefore be able to give structural information of specific target molecules without interfering into the processes under investigation. Raman spectroscopy generally fulfils these requirements, however, the complex vibrational pattern, normally obtained from biological probes, makes a selective detection method of the relevant processes by a local and a target specific signal enhancement very essential. Local enhancement can be induced by addition of noble metal nanoparticles that are able to create surface plasmon resonances (SPRs) upon light excitation. This effect has been largely exploited for surface enhanced Raman spectroscopy (SERS). A simultaneous local and target specific signal amplification can be obtained if the surface resonance of the nanoparticle is tuned to the molecular resonance of the target molecule. This two-fold resonance condition makes it in principle possible to follow specific molecules and to analyze their interaction with other molecules or interfaces. However, for reliable in-situ analysis, the particles should not only be optimised in respect to optical amplification but also appropriate coatings have to be developed that serve a certain application.

In my talk I will show several strategies to create smart Ag nanoparticles with tailored optical and chemical properties. The particles are especially designed for amplification and analysis of heme-cofactor/enzyme complexes either in solution or at interfaces.

Biography

Dr. Inez Marita Weidinger has studied Physics in Mainz, Glasgow and Berlin. She received her PhD in Physical Chemistry from the Freie Universität Berlin, Germany, in 2003. Currently she works as a research leader of the group "Novel SERS materials" at the Technische Universität Berlin. In 2007 she received the Liebig Grant from the German Chemical Industry and has since published more than 15 papers on SER applications in international journals and books.