

## Executive Summary

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*Project “Integrated Nanoparticles: An Approach Towards the Realization of Single Electron Switching and Memory Concept“*

The NRP 62 project “Integrated Nanoparticles: An Approach Towards the Realization of Single Electron Switching and Memory Concept” is geared towards the tailor-made synthesis of functional gold nanoparticles (Au NPs) and their electronic investigation in various set-ups. The final goal is their integration as smart materials in electronic and optical applications.

So far the synthesis team in Basel succeeded in controlling the Au NP’s size, the number, spatial arrangement, and chemical nature of the functional anchor groups that decorate the particle’s surface. Unfortunately the stability features of these macromolecule(s) coated NPs did not allow their immobilization on an electrified electrode.

The physical chemical team in Berne successfully investigated electronic properties of various metal NPs. In particular quantized charging was observed for ligand coated as well as ligand free particles in an electrochemical experiment. NPs coated with an insulating shell were successfully used as smart materials and acted as antennas enabling Raman experiments with unprecedented sensitivity.

In joint efforts between both teams Au NPs with controlled size exposing functional groups allowing their immobilization on Pt electrodes were synthesized, integrated and investigated in detail.

The support by the NRP 62 yielded in about 17 scientific publications in high ranked journals so far and about 4 additional publications will appear within the next 2 years.