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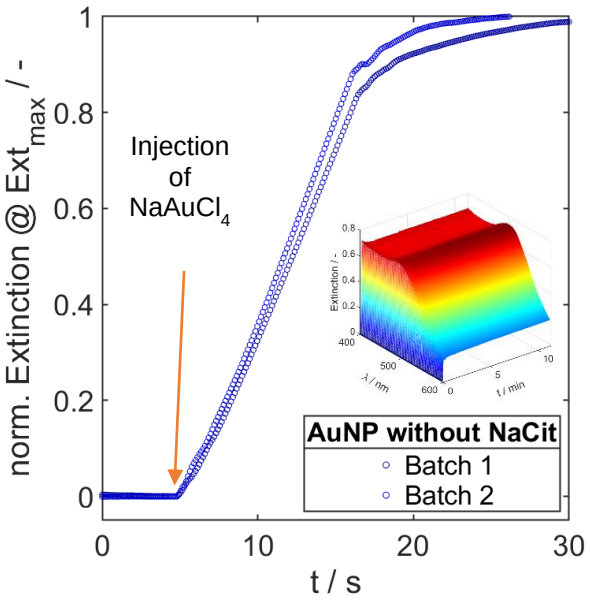
Bachelor/Master thesis: Synthesis of noble metal nanoparticles

Dear students,

we are seeking a B.Sc. or M.Sc. student for kinetical precipitation studies of noble metal nanoparticles. Noble metal nanoparticles, e.g. Au and Ag, have an important optical property, the so- called localized surface plasmon resonance (LSPR). This surface plasmon resonance depends on the metal, the particle size and shape while it is detectable by a normal UV-Vis spectroscope. In our project, we are aiming for the controlled synthesis of noble metal particles with defined size and shape to control and optimize their optical properties.



The synthesis routes of small noble metal nanoparticles consist of various coupled subprocesses: first a reduction of the noble metal, second homogeneous nucleation followed by growth. One task will include the systematic implementation of parameter studies and the preparation and characterization of the produced nanoparticles by UV-Vis spectroscopy, SEM/STEM, and sedimentation analysis. Based on the experimental data, a numerical model for the time evolution of the dispersed phase via population balance equations will be developed, which aims to understand the relevant subprocesses. The experimental and numerical work will then help translate the nanoparticles' batch synthesis onto a continuous noble metal nanoparticle synthesis. If you are interested in working experimentally or numerically on the synthesis of noble metal materials, a cutting-edge research project, contact us via mail markus.biegel@fau.de and tobias.schikarski@fau.de and attach your CV, as well as a copy of your marks.