

INM-KOLLOQUIUM

“GOLD NANOCRYSTALS: SINGLE PARTICLE ELECTROCHEMISTRY AND LARGE SCALE SELF-ASSEMBLY”

Prof. Dr. Paul Mulvaney

Universität Melbourne, Australien

Freitag, 13.07.2018, 11.00 Uhr

INM, Leibniz-Saal, Campus D2 5

Gastgeber: Prof. Dr. Tobias Kraus

Nanoscale semiconductor and metal nanocrystals exhibit size dependent absorption, scattering and emission spectra. While there are many applications for these materials as ensembles, increasing interest has focussed on the potential optoelectronic applications for single nanocrystals in single molecule sensing, high density information storage, high-throughput DNA screening and plasmonic imaging. Typically, single nanocrystals are studied using confocal microscopy or dark field microscopy.

In this talk, we will look at electron transfer at single particles and discuss the potential for single electron detection and the potential to understand size and shape dependence in electrochemistry by studying chemical processes at the single particle level.

A major challenge for this field is creating reproducible single particle structures. We present the first work demonstrating quantitative self-assembly and patterning of single nanocrystals from the nanometre lengthscale to the centimetre lengthscale. We will discuss several methods including capillary force assembly, chemical assembly and electrophoretic assembly. The third of these is particularly flexible. A polymer coated substrate is patterned using EBL, photolithography or nano-imprint lithography to generate a template. The substrate must be conducting. Particles are deposited either anodically or cathodically depending on their charge. We demonstrate that a wide range of particle types, particle shapes and particle sizes can be deposited. We present the first optical image created from single nanoparticles. Up to 1010 particles may be put down over a square centimetre substrate with fidelity > 95%.

Wir laden 15 Minuten vor Beginn zu einem Get-together mit dem Referenten ein.

KONTAKT

INM – Leibniz-Institut
für Neue Materialien gGmbH
Campus D2 2
66123 Saarbrücken
www.leibniz-inm.de

Christine Hartmann
Event Manager
christine.hartmann@leibniz-inm.de
Tel: 0681-9300-244
Fax: 0681-9300-233