Neues Denken. Neue Materialien.

INM COLLOQUIUM

"ELABORATION OF NANOSTRUCTURED MATERIALS : FROM A LIQUID PHASE SYNTHESIS TO CONTROLLED ASSEMBLY"

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Tuesday, April 16, 2019, 11:00 am

INM, Leibniz-Saal, Campus D2 5
Gastgeber: Prof. Dr. Tobias Kraus

The liquid phase processes are very useful for the synthesis of nanoparticles with tunable size, shape and thus physical properties. These nanoparticles can then be used as individual building blocks serving for the fabrication of new materials, exhibiting unique properties due to their nanostructuration. I will present two examples using magnetic particles : Co nanorods [1] and FeCo nanoparticles [2], starting from the nanoparticle synthesis to the controlled assembly and the final integration within functional devices as permanent magnets and radio-frequency materials respectively.
Then, I will present our recent efforts on the synthesis and controlled assembly of ultrathin gold nanowires (Au NWs). Their size homogeneity (diameter 1.7 nm, micrometer length) and their unique 1D feature confers them remarkable conductivity properties. Under electron beam the NWs recrystallize and fracture, leading to the formation of mono-atomic metal chains [3]. The atomic structure of the raw Au NWs was studied by in situ high energy-X-ray diffraction (HE-XRD) showing that they do not crystallize with the expected fcc structure but adopt a tetrahedrally close packed atomic structure [4] resulting from a compromise between a high atomic packing density and a growth confined by the OY supramolecular organization. Using a Coulomb force directed assembly by AFM nanoxerography [5], Isolated NWs could be trapped selectively at the surface of PMMA thin layers opening the way to the connection of individual NWs by soft lithography.

[1] E. Anagnostopoulou et al., Nanoscale 2016, 8, 4020.
[2] C. Garnero et al., Nanoletters 2019, 19, 1379
[3] L.-M. Lacroix et al., J. Am. Chem. Soc., 2014, 136, 13075.
[4] J. A. Vargas et al., ACS Nano 2018, 12, 9521.
[5] P. Moutet et al., Langmuir 2015, 31, 4106.
[6] El Said Nouh et al., Langmuir 2017, 33, 5456.

SHORT BIO here.

You are invited to have coffee with the speaker 15 minutes before the talk starts.

KONTAKT

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