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S E M I N A R
aus
Halbleiterphysik und Nanotechnologie

Mo, 25.01.2021, 11:15 Uhr, (Seminar via Zoom)

"New insights into shape-controlled iron oxide nanocrystal synthesis"

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Iron oxide nanocrystals (SPION) exhibit exceptional magnetic properties and play a critical role in several research areas that provide the basic concept of many future key technologies. These applications include nanohybrids[1] for medical applications and nanocomposites[2,3]. This talk will focus on the shape and size-controlled synthesis of iron oxide nanocrystals, showing new insights into the reaction mechanism of the synthesis. Since the magnetic properties are strongly dependent on the size and shape of the nanocrystals, it is of utmost interest to develop appropriate syntheses. Also, it will be explained that Matrix Assisted Laser Desorption Ionization — Time of Flight Mass Spectrometry (MALDI-TOF-MS) as an analytical method, which is rarely used in the field of nanoscience, provides a method with high potential for the elucidation of reaction mechanisms.[4]

(1) Feld, A.; Merkl, J.-P.; Kloust, H.; Flessau, S.; Schmidtke, C.; Wolter, C.; Ostermann, J.; Kampferbeck, M.; Eggers, R.; Mews, A.; et al. A Universal Approach to Ultrasmall Magneto-Fluorescent Nanohybrids. *Angew. Chemie Int. Ed.* **2015**, *54* (42), 12468–12471.

(2) Feld, A.; Koll, R.; Fruhner, L. S.; Krutyeva, M.; Pyckhout-Hintzen, W.; Weiß, C.; Heller, H.; Weimer, A.; Schmidtke, C.; Appavou, M.-S.; et al. Nanocomposites of Highly Monodisperse Encapsulated Superparamagnetic Iron Oxide Nanocrystals Homogeneously Dispersed in a Poly(Ethylene Oxide) Melt. *ACS Nano* **2017**, *11* (4), 3767–3775.

(3) Dreyer, A.; Feld, A.; Kornowski, A.; Yilmaz, E. D.; Noei, H.; Meyer, A.; Krekeler, T.; Jiao, C.; Stierle, A.; Abetz, V.; et al. Organically Linked Iron Oxide Nanoparticle Supercrystals with Exceptional Isotropic Mechanical Properties. *Nat. Mater.* **2016**, *15* (5), 522–528.

(4) Feld, A.; Weimer, A.; Kornowski, A.; Winckelmans, N.; Merkl, J.-P.; Kloust, H.; Zierold, R.; Schmidtke, C.; Schotten, T.; Riedner, M.; et al. Chemistry of Shape-Controlled Iron Oxide Nanocrystal Formation. *ACS Nano* **2019**, *13* (1), 152–162.