and Dexter–type energy transfer processes.

CPP 14.4 Tue 14:00 P3

Time resolved luminescence spectroscopy of self–assembling magnesium porphyrins — •Jędrzej Szmytkowski[1,2], Jonas Conradt[1], Chilla Malla Reddy[3], Teodor Silviu Balaban[2,3], and Heinz Kalt[1,2] — [1]Karlsruhe Institute of Technology (KIT), Universität Karlsruhe (TH), Institute of Applied Physics, Karlsruhe, Germany — [2]Center for Functional Nanostructures (CFN), Karlsruhe, Germany — [3]Karlsruhe Institute of Technology (KIT), Forschungszentrum Karlsruhe, Institute for Nanotechnology, Karlsruhe, Germany

Self–assembled porphyrins are promising materials to mimic natural bacteriochlorophylls (BChl) *c*, *d* or *e* encountered in the chlorosomes of photosynthetic bacteria. Such large assemblies of porphyrin metal complexes can be also used in hybrid solar cells as light harvesting antennas. In order to address their suitability we have studied the time resolved luminescence of novel magnesium diacetyl porphyrins. The decays of luminescence have been analyzed by a fitting procedure, which produces decay associated spectra (DAS). The analysis shows a short-lived component associated with the supramolecular architecture. This has implications for optimizing device geometries where the exciton diffusion lengths are not surpassed.

CPP 14.5 Tue 14:00 P3

Magnetische Eigenschaften Mn-dotierter CdSe/CdS-Halbleiternanopartikel bei thermischer Behandlung — •Andreas Hofmann[1], Shih-Hao Kung[1], Christina Graf[1], Krischan Jeltsch[1], Christine Boeglin[2] und Eckart Rühl[1] — [1]Inst. f. Chemie u. Biochemie, Freie Universität Berlin, 14195 Berlin — [2]Inst. de Physique et Chimie d. Materiaux de Strasbourg, 67034 Strasbourg

Mn-dotierte CdSe/CdS-Nanomischkristalle mit variabler Mn-Konzentration und einem Durchmesser von 2.9-3.8 nm wurden mit chemischen Hochtemperaturverfahren synthetisiert. Im Anschluss daran wurden die Partikel bei 210 °C für 48-72 h in Hexadecylamin getempert. Um die elektronische Struktur und die magnetischen Eigenschaften der Mn-Atome während dieser Erhitzungsphase näher zu untersuchen, wurden an den Partikeln magnetische Röntgenzirkulardichroismus-Messungen durchgeführt.[1] Dabei wurde untersucht, inwieweit hierbei eine Änderung des paramagnetischen Verhaltens erfolgt und ob eine lokale Mn-Se-Mn-Clusterbildung auftritt.[2] Die durchgeführten Messungen zeigen eine Änderung des Spinmoments nach dem Tempern infolge der veränderten lokalen Umgebung des Mn. Dabei konnte gezeigt werden, dass der Syntheseprozess den Temper-Effekt deutlich beeinflusst. Ein in Ref. [2] diskutierter Übergang des Mn vom paramagnetischen hin zum superparamagnetischen Verhalten konnte jedoch für diese Systeme ausgeschlossen werden, da keine oder nur eine unvollständige Clusterbildung stattfindet. [1] A. Hofmann et al. Chem. Phys. Chem. 8, 2008 (2007). [2] D. Magana et al. J. Am. Chem. Soc. 128, 293 (2006).

CPP 14.6 Tue 14:00 P3

Spectroscopic fingerprints of photodegrading CdSe/ZnS quantum dots — •Danny Kowerko, Jörg Schuster, and Christian von Borczyskowsi — Center of nanostructured materials and analytics, TU-Chemnitz, 09107 Chemnitz

Colloidal semiconductor nanocrystals have been under investigation for more than a decade with a growing field of applications in science and industry. However, photophysics and chemistry are still not fully understood, since crystal structure of core and shell as well as ligands may vary slightly between different charges, thus yielding individual optical properties even of single quantum dots from the same stock. We will discuss the role of surface (states) and its defined modification (e.g. by functionalized dye molecules) with special regard to nanocrystal degradation processes which are obviously accompanied by distinct spectral shifts and lifetime alterations. Besides time resolved ensemble studies in solution, we have chosen a multiparameter single particle approach, giving insight to spectral and luminescence lifetime fluctuations of individual quantum dots. Comparison of individual - on SiO2 immobilized - untreated and modified species will provide a deeper insight towards the underlying mechanisms of surface manipulation induced photodegradation and thus allow for a correlation with the ensemble results.

CPP 14.7 Tue 14:00 P3

Sidewall functionalization of carbon nanotubes for preparation of nanocomposites — •Anastasia Golosova[1,2], Gerhard Richter[2], Andreas Timmann[3], Rainer Jordan[2], and Christine Papadakis[1] — [1]TU München, Physikdepartment, Garching — [2]TU München, Department Chemie, Garching — [3]HASYLAB at DESY, Hamburg

In polymer nanocomposites, the nanometer size active fillers can change the material properties of polymer matrices within a wide range. Among others, carbon nanotubes (CNTs) are some of the most intriguing additives due to their unique mechanical, thermal, and electrical properties. However, until now the challenge of efficient incorporation and compatibilization of the CNTs with the surrounding matrix, which is crucial for the anticipated improved properties of the composite, is still unsolved.

To tune the surface properties of CNTs we extended a recently developed modification to form well-defined self-assembled monolayers from (bi)phenyl diazonium salt derivatives on carbon-based substrates to the sidewall modification of CNTs. Successful covalent functionalization of the nanotubes was confirmed by Raman spectroscopy and thermo-gravimetric analysis.

In order to investigate the dispersion ability of modified samples, we performed SAXS experiments (HASYLAB at DESY). Intensive scattering from big agglomerates of raw carbon nanotubes in deionized water was observed, while the dispersions of modified CNTs were homogeneous, which confirms better solubility of functionalized samples.

CPP 14.8 Tue 14:00 P3

Characterization of optical active nanostructures on silicon — •Thomas Baumgärtel, Harald Graaf, and Christian von Borczyskowski — Center of Nanostructured Materials and Analytics, TU Chemnitz, 09107 Chemnitz, Germany

Anchoring optically active molecules on nanostructured surfaces is a promising step towards building complex structures with variable properties and functions. Recently we could demonstrate that nanostructures on silicon surfaces can be functionalized in a neat way through selective binding of dye molecules and nanoparticles [1]. Here we report on the characterization of nanostructures on silicon that have been optically functionalized by binding of cationic dye molecules. The nanostructures were created by AFM-induced local anodic oxidation of dodecyl-terminated silicon. The two cationic dyes rhodamine 6G and cresyl violet have been selectively attached to nanostructures via electrostatic interactions and were studied using wide-field and confocal microscopy. The spectrum of the bound dyes indicates the existence of two different species of molecules: some of the molecules show the same spectral emission compared to dye molecules in solution, for other molecules there is a clear blue-shift of the emission wavelength. The bleaching behaviour of the dyes on to the structure follows a biexponential decrease pointing also towards two different species of bound dyes.

[1] H. Graaf, M. Vieluf, and C. von Borczyskowski, Nanotechnology 18, 265306 (2007)

CPP 14.9 Tue 14:00 P3

Mechanical properties of self-assembled mesoscale fibers investigated by AFM bending experiments — •Daniel Kluge[1], Frank Abraham[2], Stephan Schmidt[1], Hans-Werner Schmidt[2], and Andreas Fery[1] — [1]Department of Physical Chemistry II, University of Bayreuth, Universitätsstraße 30, 95440 Bayreuth, Germany — [2]Department of Macromolecular Chemistry I, University of Bayreuth, Universitätsstraße 30, 95440 Bayreuth, Germany

Fibers with diameters in the range of nm to μm have a large field of applications, mainly for tissue engineering and in composite materials. However, little is known about the mechanical properties of individual fibers on the mesoscale. We used AFM (atomic force microscopy) for force measurements in analogy to a macroscopic 3 point bending test to investigate self-assembled fiber-like structures of aromatic benzene trisamides. These had the ability to form remarkable hexagonal hollow cylinder morphologies. Our results suggest that their elastic modulus is comparable to semi-crystalline polymers. One special feature of our measurements was the usage of the force mapping mode of the AFM. This was a facile way to enhance the reliability of the measurements and collect significant amounts of data at the same time. The extensive data collection of our method marks a good starting point for future modeling and a thorough understanding of single-fiber deformation on the mesoscale.

CPP 14.10 Tue 14:00 P3

Molecular dynamics simulations of nucleation and growth of mixed $FeCl_2$/NaCl nanoparticles from supercritical water — •Norbert Lümmen and Bjørn Kvamme — University in Bergen, De-