ticles of various materials with narrow size distribution. A regular arrangement of the particles was accomplished by self organization on bacterial S layer templates [1]. One problem inherent to this approach is the agglomeration of the nanoparticles due to the statistical arrival at the substrate. The deposition of gas phase prepared FePt nanoparticles with 5 nm in size in the presence of a magnetic field of 1 T onto carbon-coated TEM grids leads to the formation of hexagonal-like particles patterns with interparticle distances of 7nm and thereby to a significant decrease of agglomeration [2]. Interestingly, comparable results are found for CuAu nanoparticles. The magnetic properties of the CuAu nanoparticles and the physical origin for the observed self-organization are discussed.

[1] U.Queitsch et al., Appl. Phys. Lett. 90, 113114 (2007)
[2] U.Queitsch et al., J. Phys. D: Appl. Phys., 41 (2008)

MA 40.21 Fri 11:00 P1A

Synthesis and magnetic characterisation of MnAs nanoparticles on GaAs surfaces — •Michael Wolff[1], Maria Messing[2], Knut Deppert[2], and Kornelius Nielsch[1] — [1]Univ Hamburg, Inst Appl Phys, D-20355 Hamburg, Germany — [2]Lund Univ, S-22100 Lund, Sweden

In order to explore the possibility to generate ferromagnetic nanoparticles via annealing of monodisperse aerosol particles, Mn particles are generated in a spark discharge and then, after being sintered and size-selected in an aerosol setup, deposited on (111)B-GaAs substrates. The Mn particles transform into MnAs particles by annealing them under an Arsine background pressure. The reaction takes place in a MOVPE chamber under hydrogen atmosphere. The particle diameter can be controlled and is varied between 15 and 40 nm. While the crystallographic orientation of the Mn particles before annealing is randomly distributed, the crystal structure of the MnAs particles after annealing seems to be determined by the GaAs surface. The magnetic properties are studied using a SQUID magnetometer. The coercive field is expected to depend on the particle diameter and the orientation of the applied field. The substrate's influence on the magnetic properties is investigated by comparing particles on different GaAs surfaces.

MA 40.22 Fri 11:00 P1A

Tuning the Dimensionality and Magnetic Properties of Mixed Valence Mn(II)/Mn(III) Coordination Polymers — Sudarshana Mukherjee[1], Yanhua Lan[1], •George Kostakis[2], Redolphe Clérac[3], Christopher Anson[1], and Annie Powell[1,2] — [1]Institut für Anorganische Chemie der Universität Karlsruhe, Engesserstr. 15, D-76131 Karlsruhe, Germany — [2]Institut für Nanotechnologie, Forschungszentrum Karlsruhe, Postfach 3640, D-76021 Karlsruhe, Germany — [3]Université de Bordeaux, UPR 8641, Pessac, F-33600, France

Four 3D metal organic frameworks and the 1D coordination polymer have been synthesized. The 3D frameworks of compounds can be described as diamondoid networks. Magnetic studies show that weak MnII-MnIII antiferromagnetic interactions (in the range of -0.55 - 0.22 K) mediated by syn-anti carboxylate bridges are present in all compounds. While the 1D coordiantion polymer remains paramagnetic down to 1.8 K, the 3D networks exhibit long-range ferrimagnetic ordering below 7.4 K (1), 4.6 K (2), 3.0 K (3) and 7.7 K for 4. The decrease of the critical temperature reflects the increase of the coordination sphere number around the Mn(II) site from four in 1, five in 2 and six in 3 that lower the bond strength and also the magnetic interactions. This result also reinforces the hypothesis that the structures of 1 and 4 are similar as also suggested by the X-ray analysis.

MA 40.23 Fri 11:00 P1A

Magnetoelastic effects of magnetic nanoparticles in a copolymer matrix — •W. Schirmacher[1], A. Omran[2], L. Schulz[3], S. Vallopilly[4], P. Böni[2], W. Petry[2], and P. Müller-Buschbaum[2] — [1]Institut für Physik, Universität Mainz — [2]Physik-Department E13, TU München — [3]Universite de Fribourg, Switzerland — [4]LENS Indiana Synchrotron Facility, Bloomington IN, USA

Magnetic properties of thin composite films, consisting of polystyrene-coated γ-Fe_2O_3 (maghemite) nanoparticles embedded into polystyrene-block-polyisoprene (PS-b-I) matrices, have been investigated. The magnetization measured as a function of external field and temperature show typical features of "super-paramagnets", including a hysteresis at low temperatures and dispersive blocking, as expected for polydispersive samples. However, the differential magnetic susceptibility depends only weakly on temperature between roomtemperature and 2K. This strongly contradicts the superparamagnetic model, for which a Curie law is expected. We are able to explain our findings if we assume a mechanical twist of the particle due to the applied field. This coupling mechanism yields a temperature-independent susceptibility which is inversely proportional to the shear modulus of the copolymer matrix. We are able to successfully fit the hysteresis curves of our samples with this model.

MA 40.24 Fri 11:00 P1A

Templated self-assembly of Fe_3O_4 nanoparticles in lithographically nanopatterned lines — •Maria Jose Benitez[1,2], Oleg Petracic[1], Mathias Feyen[2], Anhui Lu[2], and Hartmut Zabel[1] — [1]Institut für Experimentalphysik/Festkörperphysik, Ruhr-Universität Bochum, D-44780 Bochum — [2]Max-Planck Institut für Kohlenforschung, D-45470 Mülheim an der Ruhr

We report on self-assembled Fe_3O_4 nanoparticle films on silicon substrates. Furthermore, using electron beam lithography we fabricate patterned trenches of 100-1000nm width for the assisted self-assembly of magnetite nanoparticles. The nanoparticles with a diameter of 20 nm were synthesized by thermal decomposition of iron oleate complex in trioctylamine and oleic acid. Individual nanoparticle behavior is governed by superparamagnetism. Above the blocking temperature, the self-assembled films and the templated nanoparticles show collective behavior due to dipolar coupling as evidenced from magnetometry measurements.

MA 40.25 Fri 11:00 P1A

The effect of the sputtering gas (Ar, Xe) on FePt clusters formation, structural and magnetic properties — •valentina cantelli, jörg grenzer, johannes von borany, and jürgen fassbender — Institute of Ion Beam Physics and Materials Research, Forschungszentrum Dresden-Rossendorf, Dresden, Germany

$L1_0$ FePt phase is widely studied for magnetic recording media because of an excellent magnetocrystalline anisotropy ($K_U \sim 5\text{-}8 \times 10^{-7}$ erg/cm^3) and large magnetic moments. [1] We will report about the effect of the sputtering gases, Ar and Xe, on FePt clusters formation using magnetron sputtering deposition at high working pressures. Sequential monolayers or co-deposition have been investigated comparatively. 5 or 3 nm thick layers were deposited at RT onto SiO_2/Si substrates, subsequently annealed at 550°C in order to induce the A1-$L1_0$ ordering transformation. The highest $L1_0$ fraction was found using Xe as sputtering gas. Xe ions impact enhances layers coarsening in as-deposited films: 2 nm crystallites agglomerate in clusters having a lateral size of about 50 nm; and decreases the transformation activation energy reducing the critical thickness for the ordering transition. Layers deposited with Ar as sputter gas show an almost close morphology. Strong ferromagnetic behavior has been obtained only in the case of a sequential monolayers deposition, underlining the importance to reduce the diffusion path to an atomistic scale. [2]

[1] H. Kanazawa, G. Lanhoff, T. Suzuki, J. Appl. Phys. 87 (2000) 6143; [2] M. L. Yan, N. Powers, D. J. Sellmyer, J. Appl. Phys. 93 (2003) 8292

MA 40.26 Fri 11:00 P1A

Influence of ligands on magnetic properties of chemically synthesized FePt-nanocrystallites — •Thomas Trausnig[1], Stephan Landgraf[2], Klemens Rumpf[3], Petra Granitzer[3], Ilse Letofsky-Papst[4], Karin Wewerka[4], Gerald Kothleitner[4], Heinz Krenn[3], and Roland Würschum[1] — [1]Institut für Materialphysik, Technische Universität Graz, Petersgasse 16, A-8010 Graz, Austria — [2]Inst. f. Physikalische & Theoret. Chemie, TU Graz — [3]Inst. f. Physik, Karl-Franzens-Universität Graz — [4]Inst. f. Elektronenmikroskopie & Feinstrukturforschung, TU Graz

FePt-nanoparticles have attracted considerable interest recently with respect to possible application potentials for future storage media. FePt-particles were synthesized chemically by thermal decomposition of iron pentacarbonyl and reduction of platinum acetylacetonate. The spherical particles with a small diameter of 3.4 nm and a narrow size distribution are coated by oleic acid and oleylamine. Variation of the particle distance can be obtained by a ligand exchange process, substituting the oleic acid/oleylamine ligand shell by an octanoic acid/octylamine or an hexanoic acid/hexylamine ligand shell. The influence of the different ligand shells as well as of subsequent thermal annealing on the superpara- and ferromagnetic behaviour is studied by SQUID magnetometry.

Acknowledgement: Financial support by FWF - Austrian Science Fund (project S10405-N16) is appreciated.