

Magnetic Properties of Thin Films of FePt Nanoparticles Studied with AFM/MFM

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Magnetic FePt nanoparticles with narrow size distributions are prepared by wet chemical methods. The particles are passivated by an organic ligand shell and can be dissolved in various nonpolar solvents. We aim at preparing very thin films of variable thicknesses (down to single monolayer) by using both a simple drop casting procedure, wherein the interparticle separation is determined by the capping molecules, as well as more refined Langmuir-Blodgett or Langmuir-Schaefer techniques.

The morphology of the surface will be studied by AFM, the magnetic properties by MFM. The focus of the 'magnetic part' of the project will be on the magnetic domain structure of the 2D superlattice. The chemical synthesis technique used allows us to vary the composition of the nanoparticles, their size (4-10 nm) and their mutual distance, thereby being able to vary the magnetic properties of the films.

Recently we have installed an OMICRON UHV VT AFM/STM system in our laboratory. The set-up is also equipped with an Auger system. All techniques are presently operational, including MFM. As a test we have imaged the topography of a hard disk with a resolution better than 50 nm as well as the magnetic domains. At the conference, first results of AFM and MFM measurements on thin films of FePt nanoparticles will be presented.