protonated/deuterated states (S and M subunits protonated, S deuterated and M protonated) for which SANS data has been collected in a number of H:D solvent contrasts in the presence and absence of DNA. *Ab initio* shape determination of this contrast matched data has allowed us to determine the change in subunit positioning that occurs on DNA binding and how this results in the 60Å reduction in the dimensions of the enzyme.

Keywords: SANS, restriction-modification, contrast

MS56.27.5

Acta Cryst. (2005). A**61**, C74

Nanostructure and Ordering in Magnetic Liquids Probed by SAXS and SANS

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Surfactant stabilized magnetic liquids of different concentrations and compositions have been studied by small-angle scattering using polarized neutrons and synchrotron x-rays. Magnetic liquids or ferrofluids are colloidally stable dispersions of homogeneously dispersed magnetic nanosized particles with e.g. cobalt or magnetite cores in suitable liquid carriers. Magnetosomes are intracellular nanosized magnetite crystals, covered by protein and lipid membranes formed by biological mechanism in magnetotactic bacteria.

The structure and size distribution of core-shell particles and of magnetic aggregates are studied in diluted ferrofluids. Interparticle interactions are induced in concentrated fluids (up to 6 vol% magnetic crystals) by an applied external magnetic field that gives rise to ordering of the core-shell particles.

Co particles are arranged in pseudocrystalline hexagonal planes with the magnetic moments aligned parallel to the [110] direction. Magnetite based ferrofluids show orientation effects with decreased order comparing to Co based fluids, because of their lower magnetic interaction. In case of higher concentrated magnetosomes, particles are aggregated in finite segments of chains which were found aligned in the direction of the external field.

[1] Wiedenmann A., et al., *Phys. Rev. E*, 2003, **68**, 031203. [2] Hoell A., et al., *Physica B*, 2004, **B 350**, e309.

Keywords: small-angle scattering, ferrofluids, magnetic ordering