

Control of Interparticle Distance of Ordered Iron-Oxide Nanoparticle Assemblies by Means of Surfactant Design

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Abstract. The iron oxide nanoparticles (IONPs) covered with different lengths and effect of nanoparticle effective size on interparticle distance was investigated. To obtain different interparticle distance, the IONPs with the size of 6.5 nm were functionalized by three kinds of surfactants: mixture of oleic acid/oleylamine, polybutylacrylate and polystyrene. Both hydrodynamic diameter and size distribution of nanoparticles in colloidal solution were measured by dynamic light scattering (DLS) in range from 8 to 17 nm. The ordering and homogeneity of the prepared Langmuir monolayers on solid surface was studied by scanning electron microscope (SEM) and atomic force microscopy (AFM). Method of pair correlation function was used for calculation of interparticle distance ensuing from SEM images. The distances from center to center of particles varied in the range from 6.75 to 11.75 nm. From the results it follows that we are able to change of interparticle distance on a solid substrate using of nanoparticles with different surfactant size.