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pH Control of transfer of nanoparticles from aqueous to oleic phase

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We present nanoparticles that exhibit the ability to migrate onto the interface between oleic and aquatic phase as well as that can transfer from the aquatic phase into the oleic phase. As the oleic and aqueous phase hexane and water/methanol mixture is employed, respectively. Importantly, the migration of the nanoparticles is possible without introducing any chemical change to the surface ligands. The migration process is initiated by mechanical agitation or a thermal quench induced in the system. Both these factors give rise to the formation of microdroplets of hexane that carry the nanoparticles as their cargo from aqueous to oleic phase. The nanoparticles' migration capability is controlled by changing the pH-level of the aqueous phase. Such pH dependency results from the chemical structure of the aminothiolate ligands used to functionalize the nanoparticles. At high pH-level, the nanoparticles are highly polar due to strong protonation of ligands, and at low pH-levels their polarity is decreased. Depending on the degree of surface protonation and the interfacial tension between the oleic and aqueous phases the nanoparticles can either transfer to the oleic phase or adsorb at the interface.

Biography

Michalina Iwan has obtained her Master's degree in chemistry from University of Warsaw, Poland, in 2011. Her Master's thesis concerned the functionalization of gold nanoparticles with liquid-crystalline molecules. She is a PhD student at the Institute of Physical Chemistry, Polish Academy of Sciences in Warsaw, since 2011.

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