Supporting Information



1. Surface dilatational viscoelasticity:

SI Figure 1: Complex surface dilatational viscoelasticity E^* versus frequency f for the system γ -Fe₂O₃ (0.05 %wt) with SDS (a) and CTAB (b) for different surfactant concentrations. ($\gamma = 0.1$ %).



SI Figure 2: Complex surface dilatational viscoelasticity E^* versus surfactant concentration for the system γ -Fe₂O₃ (0.05 %wt) with Brij35 (a), SDS (b) and CTAB (c) for two different frequencies. ($\gamma = 0.1$ %).

2. X-ray reflectivities of the NP/SDS system:

The Fresnel normalized reflectivities are displayed in SI Figure 2.



SI Figure 2: Fresnel normalized reflectivities for SDS adsorption layer and aqueous γ -Fe₂O₃ hydrosol, after 30 min and 20 h.

First the reflectivities of a SDS adsorption layer without the presence of nanoparticles was analyzed. The reflectivity was refined assuming a box model employing the effective density model.²² The refined reflectivities are displayed in SI Figure 2 as solid lines. In the following the reflectivity of the aqueous γ -Fe₂O₃ hydrosol solutions were analysed. The adsorbed γ -Fe₂O₃ layer was divided into two sub-layers. This was necessary in order to model the asymmetric shape of the adsorbed nanoparticle layer.