Exercise 5

To be discussed on 27.11.2018

1.)
The stability of colloids is determined by the interaction between the particles. How to stabilize colloidal suspensions? Discuss the different interactions to take into account.

2.)
Stabilization of emulsion and suspensions is very important for many daily life products e.g. cosmetic products (creams, shampoos) or food products (milk products, salad dressings). Calculate the speed of sedimentation or creaming for a emulsion of olive oil in water.

\[ \rho_p = \rho_{\text{olive oil}} = 910 \text{ kg/m}^3 \]
\[ \rho_f = \rho_{\text{water}} = 1000 \text{ kg/m}^3 \]
\[ \mu = 10^{-3} \text{ kg/ms} \]
\[ R = 100 \mu m \]

3.)
Consider a colloid of charged spheres all of radius 0.1 μm in an aqueous solution of sodium chloride. Calculate the Debye screening length for salt concentrations of \(10^{-5}\) mol/dm\(^3\).