Exercise 6

To be discussed on 04.12.2018

1.)
Although the colloidal medium remains electrically neutral globally, the surface charges on the surface of colloidal particles still exist. Explain the origins of electrostatic forces.

2.)
There are different deposition techniques (spray coating, inkjet printing) in which droplets of a solution are brought in contact with a substrate. After evaporation of the solvent the dissolved or dispersed material constitutes the coating. Individual dried droplet might show a “coffee ring effect”. That means more material is accumulated at the edges of the initial droplet than in the center of the structure.

Read J. Phys. Chem. B 2010, 114, 5269-5274 and answer the following questions:

- In which applications such structures should be avoided?
- Which parameters influence the formation of coffee rings?
- How can one avoid the formation of coffee rings?
3.)

The Van der Waals force includes three kinds of dipole-dipole interactions: Keesom, Debye and London dispersion interactions. Usually the dispersion interactions dominate. Explain.

4.)

The Van der Waals energy between two molecules decreases with $1/D^6$. For macroscopic bodies e.g. Colloids the decay is less steep and it depends on the shape of interacting objects. Explain.