Soft Matter Physics

Questions & Problems 2: Surfaces & Surfactants

1. a) Surface tension: definition and equivalence of the mechanical and thermodynamic routes.

b) Solve problem 4.7 of the Textbook by Doi.

1. a) Wetting: mechanical and thermodynamic routes. Spreading coefficient. Equilibrium states of droplets on surfaces.

b) Solve problem 4.6 of the Textbook by Doi.

1. a) Capillary radius and the equilibrium height of films. Other capillary phenomena on the microscopic, mesoscopic and macroscopic scales.

b) Solve problem 4.5 of the Textbook by Doi.

1. a) Surfactants: surface tension and surface pressure. Critical micellar concentration and Langmuir equation.

b) Solve problem 4.4 of the Textbook by Doi.

1. a) Surfactants: bilayers and lamellar phases. Cubic and bicontinuous phases.

b) Solve problem 4.3 of the Textbook by Doi.

1. a) Colloidal interactions: quantitative and qualitative discussion of three types of colloidal interactions.

b) Solve problems 4.1 and 4.2 of the Textbook by Doi.