

DAVOR KOVAČEVIĆ: PHYSICAL CHEMISTRY OF MACROMOLECULES

Course content



Macromolecules: polymers, polyelectrolytes, polysaccharides, proteins, structural models, chain configuration; effect of structure and molar mass on physico-chemical properties of macromolecules. Electrostatic interactions in macromolecule solutions; problem of excluded volume, application of numerical simulation methods. Methods for molar mass determination; osmotic pressure, sedimentation, viscosity. Methods for particle size determination; light scattering, x-ray scattering, neutron scattering, microscopic methods. Polymers in solution; solubility, conformation, formation of polyelectrolyte complexes. Polymers on surface; polymer adsorption, kinetics of adsorption, polyelectrolyte multilayers, polyelectrolyte brushes.

1. Describe basic types of macromolecules (polymers, polyelectrolytes, polysaccharides, proteins) and explain their properties.
2. Explain and compare various methods for synthesis of polymers.
3. Name and explain the methods for determination of molar mass and size of macromolecules.
4. Derive the thermodynamic functions of state of mixing a polymer chain with solvents on the basis of the Flory theory and explain the problem of the excluded volume.
5. Describe and explain the properties of polyelectrolytes in solution.
6. Describe and explain the specificities of polyelectrolyte adsorption.

Learning outcomes

