PHYSICAL CHEMISTRY LAB TOPICS

For Students of Faculty of Chemical Technology

Chemical Technology

Semester IV, year. 2024/2025

CHEMICAL KINETICS

General Concepts of Kinetics. Collision Theory, Activated-Complex Theory. Mechanisms of the Chemical Reactions – unimolecular, bimolecular and termolecular reactions. Rate of chemical reaction. Rate constant. Order of the Chemical Reaction. Zero, first, second, and third-order rate equations. Temperature dependence of the rate constant. Activation Energy.

Ionic strength of an electrolyte. Influence of the ionic strength on the chemical reaction rate. Spectrophotometer construction. Principles of the spectrophotometric measurements. Lambert-Beer law.

ELECTROCHEMISTRY

Electrolysis. Types of half-cells. Methods of EMF (electromotive force) determination. Types of the galvanic cells. Primary and Secondary Cells. Deposition potential. Overpotential varieties. Hydrogen overpotential.

Ion mobility. Transfer number. Electric Double-Layer. Electrokinetic phenomena. Diffusion potential. Concentration cells.

SURFACE EQUILIBRIUM

Physical and Chemical Adsorption. Isotherms of adsorption: Linear, Freundlich, Langmuir, BET equations. Adsorbents – properties. Spectrophotometer construction. Principles of the spectrophotometric measurements. Lambert-Beer law. Surface tension and measurement methods. Gibbs adsorption isotherm. Flotation. Surfactants. Foams and emulsions.

Warning!
Laboratory coat and safety glasses are required!

REFERENCES

1. P. Atkins, Physical Chemistry. Any Edition
2. A. Bard, Electrochemical Methods, Fundamentals and Application, Wiley & Sons, New York, 2001
3. R.S. Barry, S.A. Rice, J. Ross, Physical Chemistry, Wiley & Sons, New York 1980.
4. A.P Gast, A.W. Adamson, Physical Chemistry of Surfaces, Wiley & Sons Inc. New York, 1997
5. Physical Chemistry Lab. Instructions, https:///moodle.put.poznan.pl

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