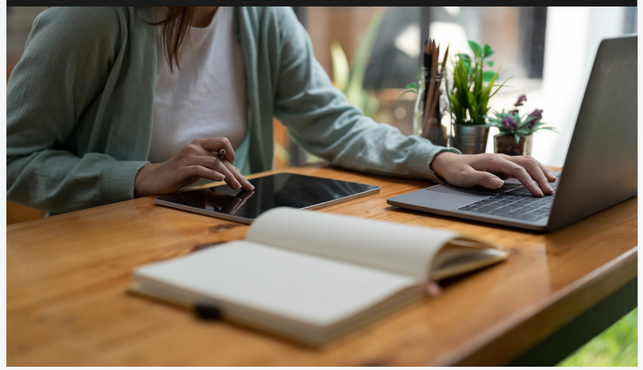
NIKOLA BREGOVIĆ: ELECTROCHEMISTRY

Course content



Electrolyte solutions: strong electrolyte structural models (Debye&Hückel, Bjerrum, Fuoss); weak electrolytes, polyelectrolytes. Galvanic cell: electrical interfacial layer, electromotivity (electromotive force) ? definition and measurements; ion-selective electrodes; potentiometry and potentiometric titration. Kinetics of electrode reactions: polarization, overpotential; Butler-Volmer model, Tafel plot; electrodes: dropping mercury electrode, stationary electrodes, rotating electrodes. Voltammetric methods: polarography, stationary voltammetry, linear sweep voltammetry, cyclic voltammetry, square vawe voltammetry, anodic stripping voltammetry, adsorptive stripping voltammetry, electrochemical impedance spectroscopy. Applications: electrochemical analysis, fuel cells, corrosion, bioelectrochemistry.

Learning outcomes

1. Describe and explain the properties of electrolyte solutions
2. Describe and compare the structural models of strong electrolyte solutions (Debye&Hückel, Bjerrum, etc)
3. Explain the application of glass electrode for measuring pH.
4. Name the basic voltammetric techniques and explain their most important properties and applications.
5. Describe and explain the kinetics of electrode processes using Butler-Volmer model.
6. Explain the application of electrochemistry on the example of electrochemical analysis, fuel cells, corrosion and bioelectrochemistry.