

C8102 Special methods - laboratory course

Autumn 2020 - 5-hour laboratory practice (in BLOCKS)

A) ELECTROANALYTICAL METHODS

1. Prof. Trnková

Analytical application of a new electrochemical elimination voltammetry (EVLS) method in combination with adsorptive stripping voltammetry - separation of close potential oxidation or reduction signals.

2. Prof. Trnková

Electrochemical Impedance Spectroscopy (EIS). Characterization of electrode surfaces. Study of system redox kinetics on modified and unmodified electrodes.

B) SPECTRAL METHODS

3. Assoc. Prof. Novotný, Dr. Hrdlička, Dr. Vaculovič

Methods for decomposition of samples: cryogenic grinding, microwave decomposition. Solution analysis: ICP OES and ICP MS spectrometry.

4. Assoc. Prof. Novotný, Dr. Hrdlička, Dr. Vaculovič

Analytical methods based on laser ablation (LA ICP MS). Laser-induced breakdown spectroscopy (LIBS): surface mapping.

C) SEPARATION METHODS

5. Dr. Farková

Optimization of ion determination in waters by chrono potentiometric, voltammetric and ITP methods.

6. Assoc. Prof. Urban

Comparison of capillary and conventional HPLC - Determination of dopamine using calibration curve, effect of injected volume and column type on the determination

7. Dr. Bittová

Liquid Chromatography in Combination with Mass Detection (LC-MS). Analysis of white wine: Determination of organic acids.

8. Prof. Preisler

CE-LIF, capillary zone electrophoresis with laser-induced fluorescence detection. Optimization of the experimental setup. Determination of detection limit of rhodamine 6G. Separation of rhodamine dyes and labeled biological peptides.

9. Prof. Preisler

Mass spectrometry of proteins and peptides using Matrix-Assisted Laser Desorption/ionization Mass Spectrometry (MALDI MS). Selected applications MALDI MS: instrument calibration, determination of molecular weight of selected analytes, enzymatic cleavage, peptide mass fingerprinting and identification of an unknown protein.