Level: Master degree – Master of Chemistry in Analytical Chemistry

Course title: Thermal Analysis

Status: elective

ECTS: 5

Requirements: Basic instrumental analysis or teacher's decision.

Learning objectives:
Theoretical and experimental knowledge needed in understanding of thermal events, methods of thermal analysis, application of thermal analysis equipment, significance of combined methods in chemical analysis, evaluation of experimental data.

Learning outcomes:
To apply methods of thermal analysis, to understand factors affecting thermal measurements, to determine optimal measurement conditions, to understand principles of combining methods of analysis, to analyze experimental data and give an adequate interpretation.

Syllabus

Theoretical instruction:
The effect of temperature change on the properties of materials. Different techniques of thermal analysis (TA): thermogravimetry (TG) and derivative thermogravimetry (DTG), differential thermal analysis (DTA) and differential scanning calorimetry (DSC), thermomechanical and dynamic thermomechanical analysis (TMA and DMA). Simultaneous methods of thermal analysis. Analysis of evolved gases (EGD and EGA). Using thermoanalytical data to obtain kinetic parameters.

Practical instruction:
Thermal characterization of newly synthesized compounds, methods in solid state synthesis, determination of melting point, polymorph transformations, purity determination. Quality control of selected samples (pharmaceuticals, foods, etc.). TA of elastomers: glass transition, TG, degree of cross-linking. Characterization of thermoplastic polymers (PE, PVC, PS, *etc*.). Calculation of thermokinetic parameters. Thermal measurements of actual samples.

Weekly teaching load				Other:
Lectures: 2	Exercises: 2	Other forms of teaching:	Student research:	