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cyklus přednášek v rámci programu INNOLEC

Isotopic analysis using ICP – mass spectrometry

6.listopad 2012, 14:00 – 17:00, UKB A14/207

Annotation:

ICP – mass spectrometry (ICP-MS) is the most powerful technique for trace and ultra-trace element analysis. As a mass spectrometric technique, however, ICP-MS also provides information on the isotopic composition of the target elements. This opens a new field of applications, in which either induced variation (caused by the use of an isotopically enriched tracer) or natural variation in the isotopic composition of a metallic or metalloid element need to be studied. In this short course, the capabilities and limitations of both single-collector ICP-MS and multi-collector ICP-MS (as a dedicated tool for isotopic analysis) will be discussed, guidelines on how to optimize isotope ratio precision and accuracy will be discussed and real-life applications will be used to illustrate the possibilities thus created. These applications include elemental assay via isotope dilution, tracer experiments, dating of geological samples, provenance determination and the use of isotope ratios as palaeoproxies.

ICP – Mass Spectrometry: instrumentation

Seminář studentů analytické chemie C9000

8.listopad 2012, 14:00 – 16:00, UKB A11/132

Annotation:

ICP – mass spectrometry (ICP-MS) is the most powerful technique for trace and ultra-trace element analysis. In this short course, the basic operating principles of the technique will be covered, with specific attention for the ICP as an ion source, the types of mass spectrometer that can be used (quadrupole filter, double-focusing sector field mass spectrometer and time-of-flight analyzer) and the electron multiplier detector. State-of-art approaches (collision/reaction cell, high mass resolution) to overcome spectral interference – traditionally the most prominent disadvantage of ICP-MS – will be reviewed. The capabilities and limitations of ICP-MS will be compared to those of other common atomic spectrometry techniques (AAS and ICP-OES). Finally, recent innovations, including simultaneous Mattauch-Herzog ICP-MS and ICP/MS-MS will be briefly discussed.

Reconstructing the past, understanding the present and predicting the future based on isotopic analysis via multi-collector ICP - mass spectrometry

Seminář XD107

8.listopad 2012, 16:00 – 17:00, UKB A11/132

Annotation:

Multi-collector ICP – mass spectrometry is a dedicated tool for the highly precise isotopic analysis of metallic and metalloid elements. Isotopic analysis of the light elements H, C, N, O and S is already relied on for decades in varying research fields. For metallic and metalloid elements, it was believed for a long time that the isotopic composition was fixed, except for elements (e.g., Sr, Pb) with one or more radiogenic nuclides (nuclides produced by radioactive decay) and for the lightest elements (e.g., Li, B) that are prone to isotope fractionation. More recent research, however, has made clear that all elements with 2 or more isotopes show natural variation in their isotopic composition as a result of fractionation. Isotopic analysis of both more traditional (Sr, Pb) and the so-called non-traditional isotopic systems provide a wealth of information that can be relied upon to reconstruct the past and understand the present, as will be demonstrated by real-life applications. As a final challenge, it will be discussed whether isotopic analysis can also predict the future