

SANDA RONČEVIĆ: ELEMENTAL AND SPECIATION ANALYSIS

Course content



Speciation in analytical identification of one or more existing forms of elements determined by isotopic composition, oxidation state, complex or macromolecular structure. Chemical species in trace range, toxic and essential species, bioavailability and toxicity of species. Structural aspects of speciation (isotopic composition (Pb,O,N,C), electronic and oxidation states (As,Cr,Fe,Mn,V), inorganic compounds and their complexes(Al,Ni), speciation of organic (As,Sb,Se,Sn,Hg),) and macromolecular compounds (Cd, Fe, Co, Pt). Speciation analysis methodology. Sampling and preparation of air, water, and biological samples. Coupled systems in speciation (LC-ICP-MS, GC-ICP-MS, FFF-ICP-MS, CE-ICP, LC-ESI-MS). Fractionation analysis methods. Dynamic aspects of speciation analysis.

1. To explain differences between analytical approach (speciation, fractionation, total content analysis). 2. To explain principal aims of speciation analysis. 3. To classify speciation according to structure of observed chemical species. 4. To describe sampling of environmental samples for speciation purposes (air, water, soil, biological samples). 5. To describe fundamental procedures for sample preparation in speciation analysis. 6. To explain critical parameters of hyphenated instrumentation for speciation aims (LC-ICP-MS, GC-AAS, GC-ICP-MS, CE-ICP-MS). 7. To describe speciation procedures for organometallic species interesting in toxicology (Pb, Sn, Hg); to describe speciation procedures for determination of species in different oxidation states (As, Cr, Fe). 8. To compare speciation problems according to isotopic composition, electronic state, inorganic complexes and macromolecular compounds. 9. To present and to interpret specific chemical speciation problem based on review of recent scientific literature data.

Learning outcomes

