

SPECTRO CIROS^{CCD} Simultaneous spectrometer of atomic emission with inductively coupled plasma

Characteristics, performances

Simultaneous detection with charge coupled device (CCD), spectral range 160 – 900 nm, plasma power 1400 W, frequency 27.12 MHz, Argon consumption 12-15 L/min, multielemental determination with limits of detection in the range of ng/ml

Uniqueness, complexity

The spectrometer is unique within the research infrastructure of the university due to the complexity of the optical mounting of CCD detectors on a Rowland circle, axial viewing of the plasma which provides detection limits one order of magnitude lower than in classical radial viewing. The spectrometer chamber is filled with nitrogen which ensures measurements in the UV spectral range down to 160 nm.

Cost and year of acquisition

105.000 EUR; 2001

Area of interest

Quantification of metals and hydride generation elements (As, Sb, etc.) and cold vapor (Hg) in environmental samples, food and materials. Speciation analyses can also be carried out, for example: arsenic speciation as arsenite, arsenate, monomethylarsonic acid, and dimethylarsinic acid; mercury speciation as inorganic species (Hg^{2+}) and organomercury compounds (monomethylmercury, CH_3Hg^+); and selenium speciation as selenite and selenate in food and environmental samples. Both solid and liquid samples can be analyzed, with a sample consumption of 5 mL per analysis. Research topics are: environment evaluation, food safety, synthesis and characterization of nano/materials, emergent technologies (eco-, nano-technologies) for material synthesis, etc.

Research groups

The instrument is used by the following units existing within Babes-Bolyai University: members of the Research Center for Advanced Chemical Analysis, Instrumentation and Chemometrics (ANALYTICA); Research Centre in Electrochemistry and Unconventional Materials, Institutes outside the university: Research Institute for Analytical Instrumentation (ICIA) Cluj-Napoca

Teaching activities

The instrument is also used by the students in teaching activities at the bachelor, master and doctoral level for carrying out laboratory experiments or research activity within the preparation of bachelor, dissertation and doctoral thesis.

MSc Courses

Analytical techniques in speciation and chemical imaging, Clinical chemistry MSc level
Environment monitoring by modern analytical methods, IMPM, MSc level

BSc Courses

Analytical chemistry - Instrumental analysis, Chemistry and Chemical Engineering specializations, all programmes, years of study II
Analytical Chemistry, Biochemistry and Industrial Biotechnology specializations, BSc level, year II

List of services offered to the academic community

- Determination of metals and hydride-forming elements (As, Sb, Se, Te, etc.) and cold vapor Hg in environmental, food, and material samples.
- Speciation analysis for As, Se, and Hg species in research projects (national and international, theses (BSc, MSc, PhD), and academic collaborations.
- Support for laboratory teaching activities at undergraduate, master's, and doctoral levels.
- Method development and validation for analytical chemistry techniques.

List of services offered to the economic sector

- Determination of trace metals and metalloids in water, soil, food, and industrial materials.
- Assessment of materials and industrial products requiring trace-level elemental determination.
- Support for R&D activities in companies working in environmental protection, food safety, material sciences, and emerging technologies.

List of services offered to the civil society

- Analysis of environmental samples (water, soil, sediments) relevant to public health, environmental protection, and community concerns.
- Support for environmental incident investigations, such as contamination events involving heavy metals

Access to infrastructure from university and external stakeholders

Contact person: Lect. Dr. Eniko Covaci

The spectrometer is operated only by trained personnel, complying with the instructions for using the instrument in the laboratory. Contact address for analysis request from research groups is: eniko.covaci@ubbcluj.ro or by phone 0264 593833/5691. The laboratory analysis request must contain details about sample characteristics and analysis purpose. The costs of the analysis will be covered by supplying the necessary consumables (argon, reagents, standards, etc.) by the beneficiary. If this is not possible, costs could be covered under a financial agreement concluded between the executor and external beneficiary.

Opening hours, access

Monday-Friday 8-16