

## Analytical Chemistry Laboratory

The Analytical Chemistry Laboratory (ACL) provides a broad range of analytical chemistry support services to the scientific and engineering programs at Argonne National Laboratory and specialized analysis for government, academic, and industrial organizations, including other national laboratories and QA/QC programs and audits.

### Analytical Services and Research

We handle a wide range of analytical problems, from routine standard analyses to unique problems that require significant development of methods and techniques.



#### Inorganic Analysis

Wet-chemical and instrumental methods for elemental, compositional and isotopic analysis of solid, liquid and gaseous samples

- Ion chromatography (IC)
- Inductively coupled plasma/atomic emission spectrometry (ICP/AES)
- Inductively coupled plasma/mass spectrometry (ICP/MS)
- Thermal ionization mass spectrometry (TIMS)
- Carbon, sulfur, oxygen, nitrogen analysis
- Autotitration
- Cold vapor atomic absorption mercury analysis

#### Microstructural Characterization

Microstructural and compositional analysis of a wide variety of materials, including some radioactive samples

- X-ray diffraction
- Scanning electron microscopy (SEM)
- Transmission electron microscopy (TEM)
- Optical microscopy

#### SEM User Facility

- SEM instrument with EDS system
- Available by the hour or half day

#### Radiochemical Analysis

Nuclear counting techniques over a wide range of sample types, from low-radioactivity environmental samples to samples with high radioactivity requiring containment

- Gamma spectrometry
- Alpha spectrometry
- Gross alpha and beta analysis
- Liquid scintillation counting
- Inorganic analysis of radioactive materials via ICP/AES or ICP/MS
- $K_d$  analysis of soil and rock

#### Organic Analysis

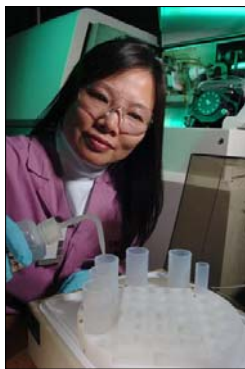
Complementary techniques for separation and quantitative analysis of trace-level complex organic mixtures and compounds

- Gas chromatography/mass spectrometry (GC/MS)
- PCB analysis

#### Environmental Characterization

Waste materials and environmental samples

- pH, cyanides, mercury, conductivity, reactive sulfides, flashpoint, PCBs, volatiles and semi-volatiles, pesticides, radionuclides, etc.
- TCLP (toxicity characteristic leaching procedure)
- Assistance with Argonne National Laboratory Waste Disposal Forms



## Free Services Provided by the Analytical Chemistry Laboratory

### Discussions of Methods and Instrumental Capabilities

We offer advice for sample handling and assist in the assessment of the best methods of analysis for particular sample or research needs. The ACL has a professional staff that will give free advice on the alternative ways to solve your analysis problems.

### Collaborative Work on Proposals and Marketing

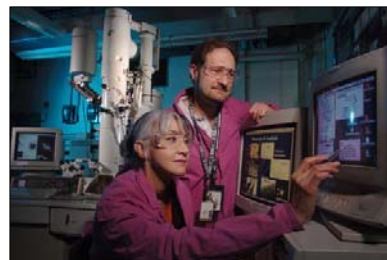
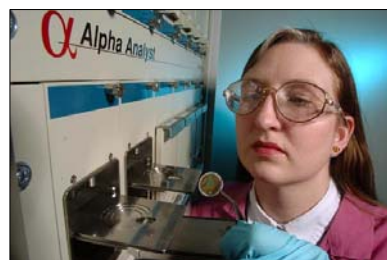
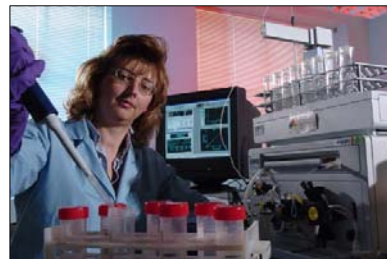
If a proposal involves analytical work, ACL staff can provide an estimate of the time and cost of that part of your project. We can also help write the analytical chemistry portion of the proposal. This free service should result in a better proposal, thereby improving its chances of being funded. If you are trying to obtain funding for a research project that would use ACL services, let us help you sell it. We can also provide laboratory tours to your sponsors or prospective sponsors.

### Estimates and Planning

Save time and money by working with ACL before submitting a sample.

## Recent Projects in the Analytical Chemistry Laboratory

- Use of the ORIGEN2 Code to Determine Isobaric Compositions in the Analysis of Spent Fuel by ICP-MS
- Analysis of Simulated Headspace Gases for the Waste Isolation Pilot Plant (WIPP)
- ICP-OES Method for Material Accountancy Measurements
- Application of MARLAP to Validation and Verification of Existing Data
- Distribution Coefficient Measurements of Radionuclides in Soils
- Isotopic Analysis of High-Burnup Spent Nuclear Fuel
- Plutonium Metal Exchange Program
- Tritium Target Qualification Project
- Switchable Neutron Source Development



### For More Information

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