CETAC Technologies ICP-AES and ICP-MS Training Classes

Syllabus

Course 201. An Introduction to Inductively Coupled Plasma Atomic Emission Spectrometry

1. Atomic Structure
2. Components of ICPs
    a. What is a Plasma?
    b. Radio Frequency Generators
    c. Sample Introduction Systems
    d. Spectrometers
    e. Detection Systems
    f. Performance Enhancers
    g. Review of ICP Instruments
3. Refinement of Measurements
    a. Calibration
    b. Background Corrections
    c. Interelement Corrections
    d. Internal Standardization
4. Other Topics
    a. Accuracy, Precision and Detection Limits
    b. Maintenance
    c. Learning Venues
5. Summary
6. References

Course 201L. An Inductively Coupled Plasma Atomic Emission Laboratory Session

1. Overview of Simultaneous ICP Systems
2. Start-Up Procedure
3. Optimization
4. Detection Limits
5. Resolution
6. Interference Studies
7. Ultrasonic Nebulization
8. Quantitative Analysis with Internal Standardization
9. Shutdown
10. Safety
11. Troubleshooting
12. Maintenance

Course 301. An Introduction to Inductively Coupled Plasma Mass Spectrometry

1. An Introduction to ICP-MS
    a. What is ICP-MS?
    b. ICP-MS Models
    c. ICP-AES versus ICP-MS
    d. Instrument Parameters
2. Liquid Sample Introduction
3. Interferences in ICP-MS
    a. Mass Spectroscopic Interferences
    b. Alternative Sample Introduction/Sample Preparation Methods
    c. High Resolution ICP-MS
    d. Non-Spectroscopic Interferences
4. Advanced Capabilities in ICP-MS
    a. Collision/Reaction Cell
    b. Time-of-Flight
5. Instrument Operation
    a. Data Acquisition and Dynamic Range
    b. Modes of Analysis
6. Solid Sample Introduction
7. Gaseous Sample Introduction
8. Sample Preparation
9. Applications
10. Summary
11. References, Journals, Newsletters

Course 301L. An Inductively Coupled Plasma Mass Spectrometry Laboratory Session

1. Overview of ICP-MS Systems
2. Start-Up Procedure
3. Optimization
4. Background Spectra (1)
5. Background Spectra (2)
6. Qualitative Analysis
7. Semiquantitative Analysis
8. Quantitative Analysis
9. Reaction Cell ICP-MS
10. Shutdown Procedure
11. Safety
12. Maintenance

An Introduction to Laser Ablation

1. Definition and Production of a LASER
2. Components of a Nd:YAG Laser
    a. Crystal
    b. Q-Switch
    c. Output Couplers
    d. Flashlamp
3. Definition of Laser Ablation
    a. History
    b. Present Configurations
4. Application Types
5. Detectors
    a. ICP-MS
    b. ICP-OES
    c. TOF-MS
    d. GC-MS
6. Optimization Considerations
    a. Ideal Sample Type
    b. Ablation method
    c. Method parameters – energy, flow rate, etc
    d. Fractionation minimization procedures
7. Calibration Approaches
    a. Direct liquid ablation
    b. Simultaneous liquid
8. Essential Laser Ablation System Hardware Components
    a. Lighting
    b. Energy Control
    c. Sample Cell Options
    d. Carrier Gas Flow Control
9. Operating Software
    a. Practical Method Development
    b. Optimization Tools
10. Data Reduction Software
    a. Flexible Signal Integration
    b. Quantitative Analysis Input Control
    c. Editable Calibration
    d. Customizable Reports