

Atomic Absorption

1. Summary of Method

Liquid samples can be analyzed for elemental species by atomic absorption spectrometry. Atomic absorption can be used to analyze for over sixty different elements with detection limits that enter the parts per billion (ppb) range. Samples are digested and the analyte is usually contained in a water solution. The sample is aspirated into the flame through a small tube or inserted into a graphite furnace for analysis.

2. Comments

Absorbance measurements can be affected by numerous interferences. See the *analysis standard conditions* from the manufacturer's handbook for specific interferences that may influence measurements of the element you intend to analyze .

3. Sample Handling and Preparation

Follow the suggestions from the manufacturer's handbook to for the digestion of your sample. Dilute your sample until the analyte concentration falls into the concentration range suggested on the sheet of *standard conditions*.

4. Apparatus

- a. atomic absorption spectrometer
- b. hollow cathode lamp for the element to be analyzed

5. Reagents

- a. Primary or secondary standard of analyte to be analyzed.
- b. Approximately 100 mL each of four or five standard with concentrations that bracket the concentration of the unknown sample. Store these in sealable plastic bottles.

- c. Approximately 100 mL of solution containing your analyte. Place this sample in a capped plastic bottle.

6. Procedure

- a. Prepare the standard and sample solutions.
- b. Bring standards, your unknown sample and a beaker of deionized water to room SC193. Set up the spectrophotometer as directed by the instructor. Optimize the AA on your most concentrated standard.
- c. Measure the absorbance of the standards, using distilled water as a blank. Prepare a calibration curve using spreadsheet program.
- d. Measure the absorbance of your unknown sample. Make sure that the reported absorbance falls within the concentration range of your standards.

7. Bibliography

- a. *Analytical Methods for Flame Photometry*, Publ #85-100009-00, Varian Techtron Pty. Ltd., Springvale, Australia, 1979.

8. Calculations and Conclusions

- a. Using the calibration curve and the absorbance of your unknown solution, calculate the concentration of analyte in your sample. Report the average and the relative standard deviation of the analyte concentration.
- b. Place a copy of your calibration curve in your laboratory notebook.