

Atomic absorption photometry / Details

Atomization

Atomization requires a temperature of 2000 to 3000 K. Usually, the sample is sprayed through a nozzle into a mist chamber and flows together with the fuel (acetylene - air) through a burner into a laminar flame. Another option is flameless atomization using an electric oven. Electrothermal atomizers operate in three different temperature steps: first, a sample of the resistance-heated substrate (most commonly graphite) in an electric furnace is evaporated, then the volatiles are removed by pyrolysis, and finally atomization is performed.

Electron excitation and electromagnetic wave emission

A beam of light of a suitable wavelength then passes through the atomized sample. The free atoms of the determined element (most often Ca, Mg and then Cu, Zn or Fe) absorb exclusively radiation of such wavelengths that causes the electron to excite to a higher electron level; when electron returns to the ground state, light of the same wavelength is emitted.

Isolation and detection of radiation of a certain wavelength

A monochromator (grid) is used to isolate the analyzed spectral line from other lines of the radiation source, and a photomultiplier is used for detection. Current state-of-the-art instruments allow automatic selection of the analyzed element (including all necessary analytical parameters) and samples are taken automatically from the sample feeder. In clinical biochemistry, these devices are not widespread because they are expensive and cover a relatively narrow range of examinations. However, a number of these instruments in the art are necessary because the determination of most trace elements (especially Cu and Zn) cannot be reliably performed in other more affordable ways.

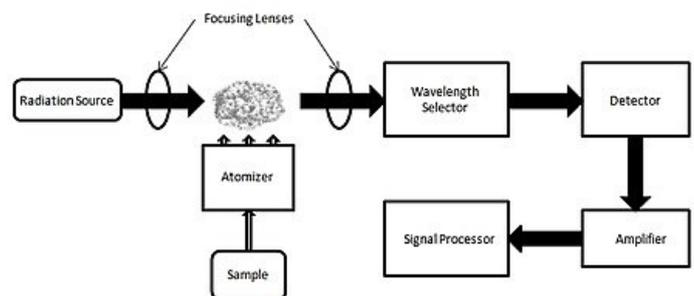
Links

Source

- ws:Atomová absorpční fotometrie/Podrobnosti

Used literature

- Štern, P. : Fundamentals of Instrumental Analysis in Clinical Biochemistry. In Schneiderka P (Ed): Selected Chapters in Clinical Biochemistry. [online] <http://www1.lf1.cuni.cz/~kocna/biochem/text11.htm>. Retrieved 2010-03-09
- Atomic absorption spectrometry
- ATOMIC ABSORPTION SPECTROMETRY on the web cheminfo.chemi.muni.cz (http://cheminfo.chemi.muni.cz/chem_sekce/predmety/C7300/AAS/aas.doc)



Schematic layout of the analyzer