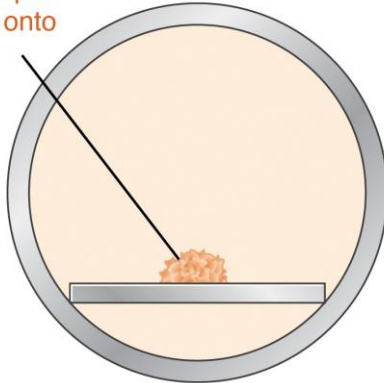


Analysis of solids by ETA

Direct solid sampling:

Solid sample weighed onto graphite platform



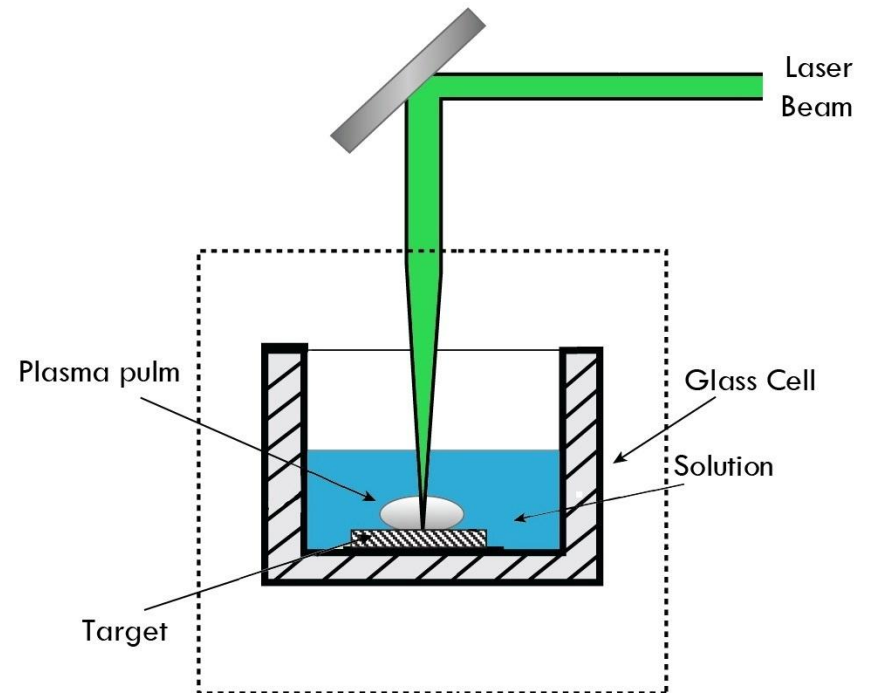
Direct solid sampling
— end view of furnace

Slurry sampling:

- A second way is to prepare a slurry of the powdered sample by ultrasonic agitation in an aqueous medium. The slurry is then pipetted into the furnace for atomization.

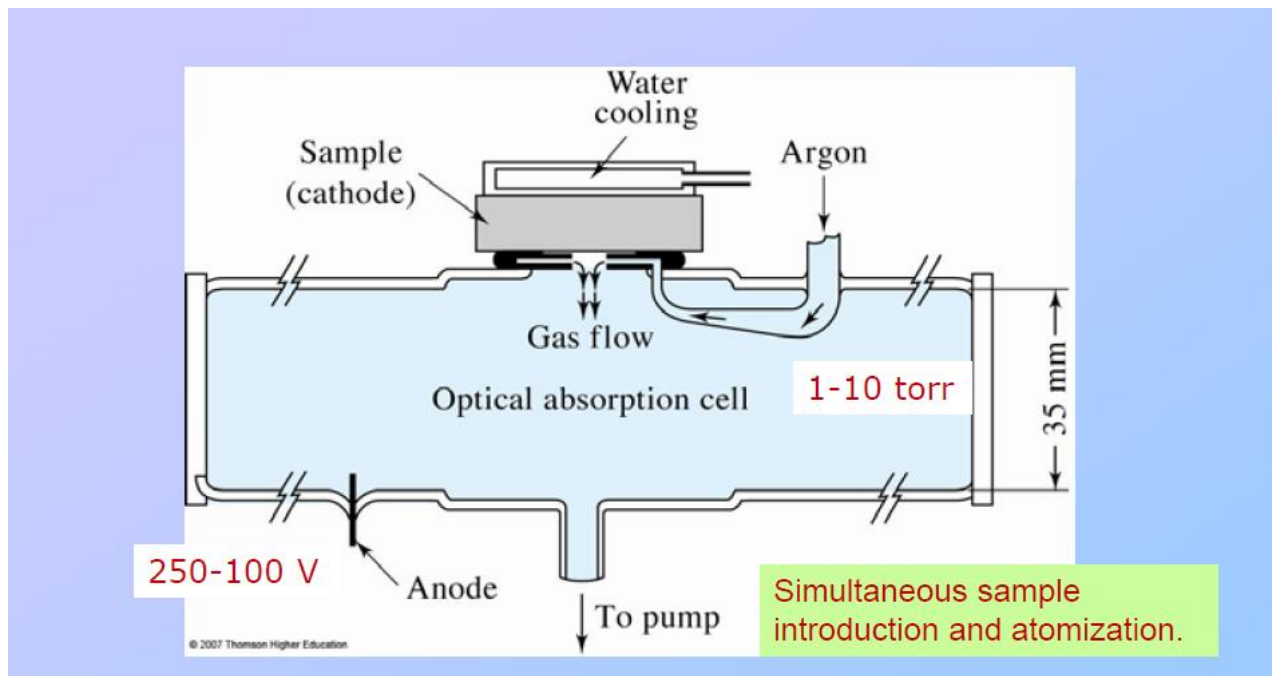
Laser ablation :

process of removing material from a solid (or occasionally liquid) surface by irradiating it with a laser beam. At low laser flux, the material is heated by the absorbed laser energy and evaporates or sublimates. At high laser flux, the material is typically converted to a plasma.



Specialized Atomization Techniques

Glow Discharge Atomization:



- A glow-discharge device (GD) serves as a versatile source, as it can simultaneously introduce and atomize the sample.
- The glow-discharge occurs in a low-pressure argon gas atmosphere between 1 and 10 torr.
- In this atmosphere lies a pair of electrodes applying a DC voltage of 250 to 1000 V to break down the argon gas into positively charged ions and electrons.
- These ions, under the influence of the electric field, are accelerated into the cathode surface containing the sample, bombarding the sample and causing neutral sample atom ejection through the process known as *sputtering*.

Glow Discharge Atomization

- The atomic vapor is composed of ions, ground state atoms, and fraction of excited atoms.
- When the excited atoms relax back into their ground state, a low-intensity glow is emitted, giving the technique its name.
- The requirement for samples is that they are electrical conductors. Therefore GD atomizers are most commonly used in the analysis of metals and other conducting samples.
- However, with proper modifications, it can be utilized to analyze liquid samples as well as nonconducting materials by mixing them with a conductor (e.g. graphite).
- Detection limits are reported to be in the low ppm range for solid samples