Performance Characteristics Of Flame Atomizers

- In terms of reproducible behavior, flame atomization appears to be superior to all other methods for liquid sample introduction.

ADVANTAGES:

1. Uniform dropsize
2. Homogeneous flame
3. Quiet flame and a long path length

- In terms of sampling efficiency and thus sensitivity, however, other atomization methods are markedly better.

DISADVANTAGES:

1. A large portion of the sample flows down the drain , ~90% of sample is lost
2. the residence time of individual atoms in the optical path in the flame is brief (~10^{-4}s).
3. Flash back, if $V_{burning} > V_{flow}$

9A-2 Electrothermal Atomization

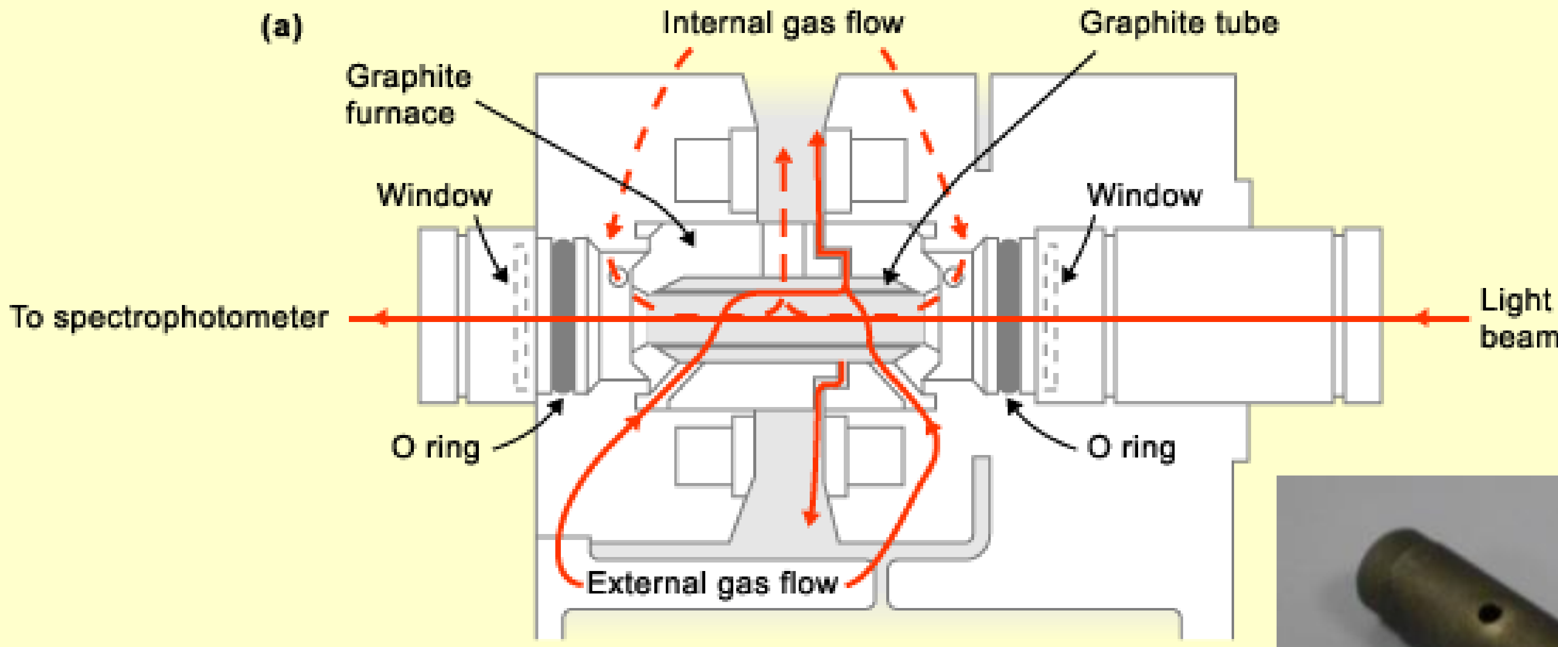
Acc. To IUPAC recommendation

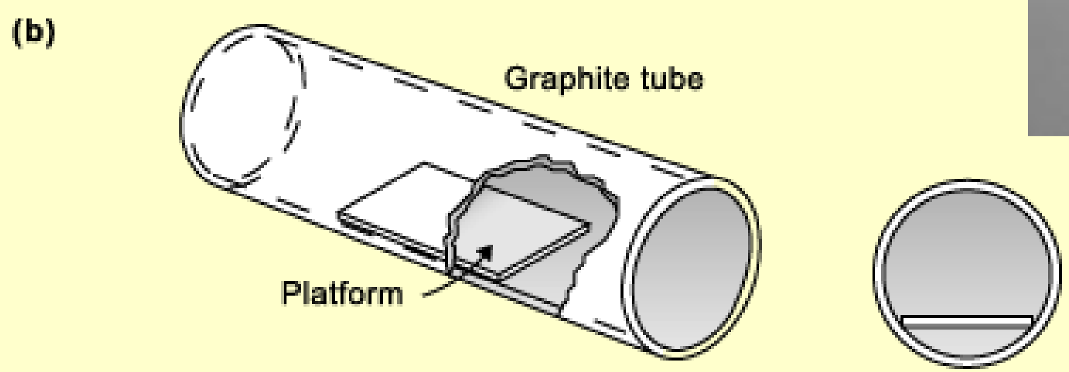
•An electrothermal atomizer is defined as a device which is heated to the temperature required for analyte atomization by the *passage of electrical current through its body*.

• This technique has largely been developed for use in atomic absorption spectrometry for which the terms electrothermal atomic absorption spectrometry, electrothermal AAS and the abbreviation ETAAS are defined.

• It has also been applied in optical emission and atomic fluorescence spectrometry, with appropriate analogous terms, such as electrothemal optical emission spectrometry, OES and electrothermal atomic fluorescence spectrometry, AFS being defined.

ElectroThermal AAS (ETAAS or GFAAS)





- The furnace goes through several steps…
  - Drying (usually just above 110 deg. C.)
  - Ashing (up to 1000 deg. C)
  - Atomization (Up to 2000-3000 C)
  - Cleanout (quick ramp up to 3500 C or so). Waste is blown out with a blast of Ar.
- The light from the source (HCL) passes through the furnace and absorption during the atomization step is recorded over several seconds. This makes ETAAS more sensitive than FAAS for most elements.