



# ATOMIC ABSORPTION SPECTROSCOPY

Principle

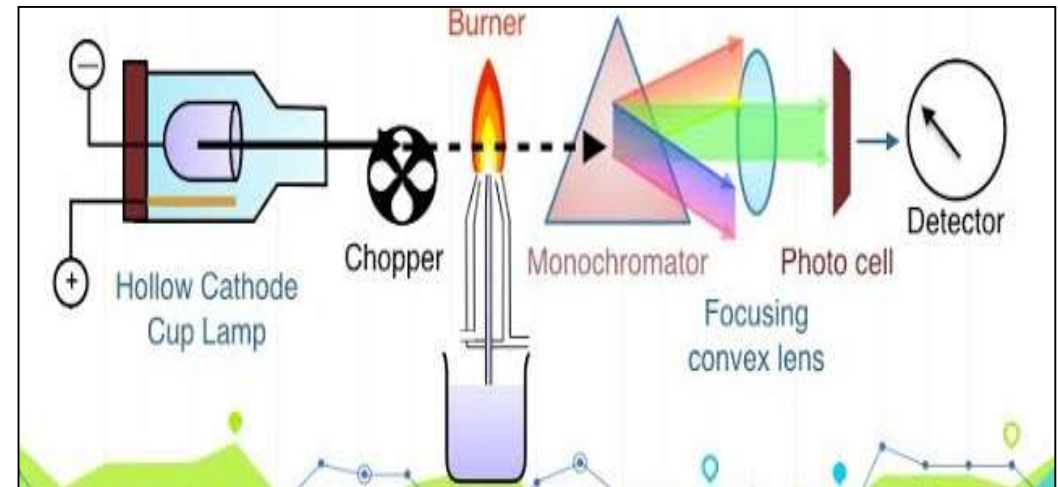
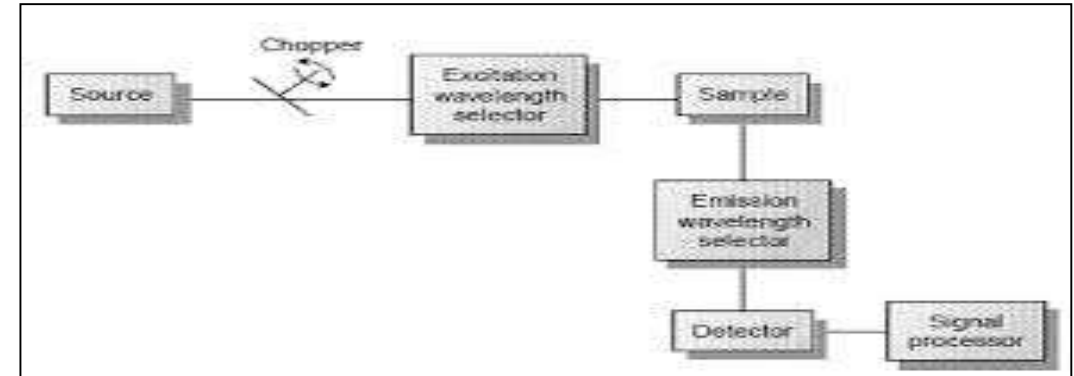
Working

Application



## PRINCIPLE

- ❖ It is based on atomization of sample by absorption of radiation by ground state gaseous atoms.
- ❖ It can be done by the following steps.
- ❖ Step-1 Atomization of the sample.
- ❖ Step- 2 The absorption of radiation from a light source by the free atoms.
- ❖ It is used to determine the presence of metals like Ni, Fe, Cu, Al, Pb, Zn, etc in liquid samples.
- ❖ It is also used to measure the concentrations of metals in the samples of concentration range in the low mg/L range.





## COMPONENTS OF AAA

### 1. Radiation source:

❖ The hollow cathode lamp is used as radiation source which provides constant intense beam of light.

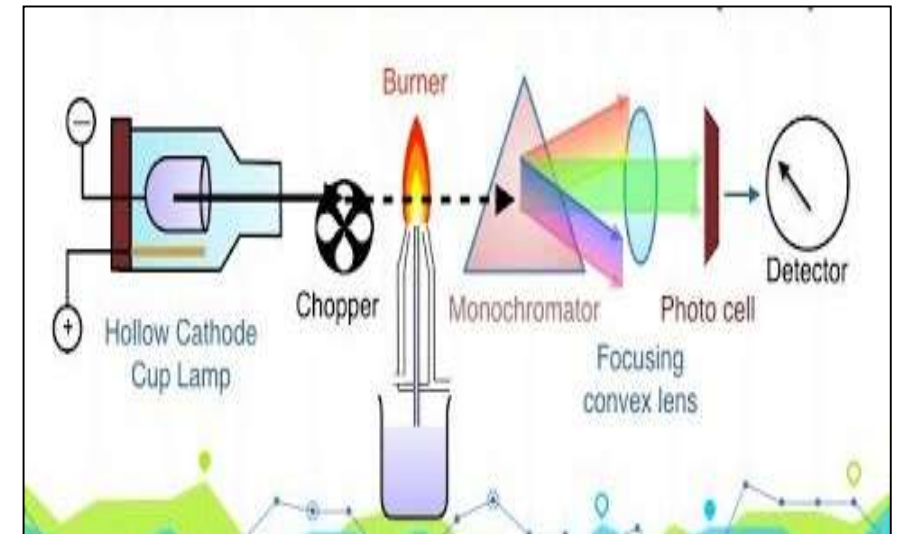
### 2. Chopper:

❖ A rotating wheel is placed between the hollow cathode lamp and the flame.

❖ It breaks the steady light.

### 3. Flame:

❖ It is used for converting the liquid sample into the gaseous state. It converts the molecule into atomic vapour. Two types of Burners used. 1. Total consumption burner 2. Premixed burner.





#### **4.Nebulizer:**

- ❖ It converts the liquid sample into atomic vapour.

#### **5.Filter:**

- ❖ It is also called monochromator.
- ❖ It select absorbing line from the spectral lines emitted from hollow cathode lamp and removes the scattered light of other wavelengths from the flame.

#### **6.Detectors:**

- ❖ It is also called photo multiplier tube. It converts the absorbed radiation into current.

#### **7.Amplifier & recorder:**

- ❖ The current from the detector is amplified and then recorded.

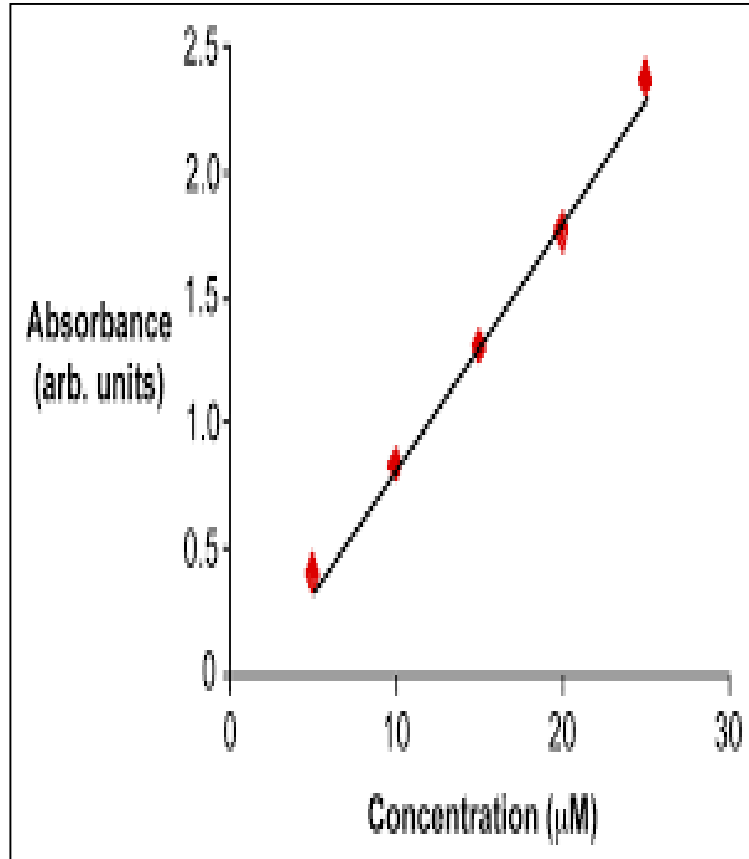


## WORKING OF AAA

- The radiation obtained from the hollow cathode lamp is passed into the flame in which the sample is aspirated.
- The metallic compound decomposes to give atoms which absorb a part of radiation in the flame.
- The unabsorbed radiation in the flame is allowed to pass through the filter and then detector.
- Finally it is amplified and recorded.
- The above experiment is carried out using a series of standard solutions and the readings noted for each trial.
- Finally a graph of calibration curve is drawn between concentration versus absorbance.
- It gives a straight line satisfying Beer – Lambert’s law.
- After finding out the absorbance of test solution experimentally, the concentration will be determined from the graph.
- Absorbance Concentration (ppm)



## APPLICATIONS



- ❖ It is used to determine the presence of metals like Ni, Fe, Cu, Al, Pb, Zn, etc in liquid samples.
- ❖ It is used to estimate the concentrations of metals in the samples of concentration range in the low mg/L range.
- ❖ It is used in pollution study.
- ❖ It is very useful in medical, biological and industrial fields.
- ❖ It is used to estimate Vanadium in lubricating oils.

## LIMITATIONS

- ❖ It is necessary to use liquid samples.
- ❖ This technique is limited to only metals and metalloids