

Flame photometer

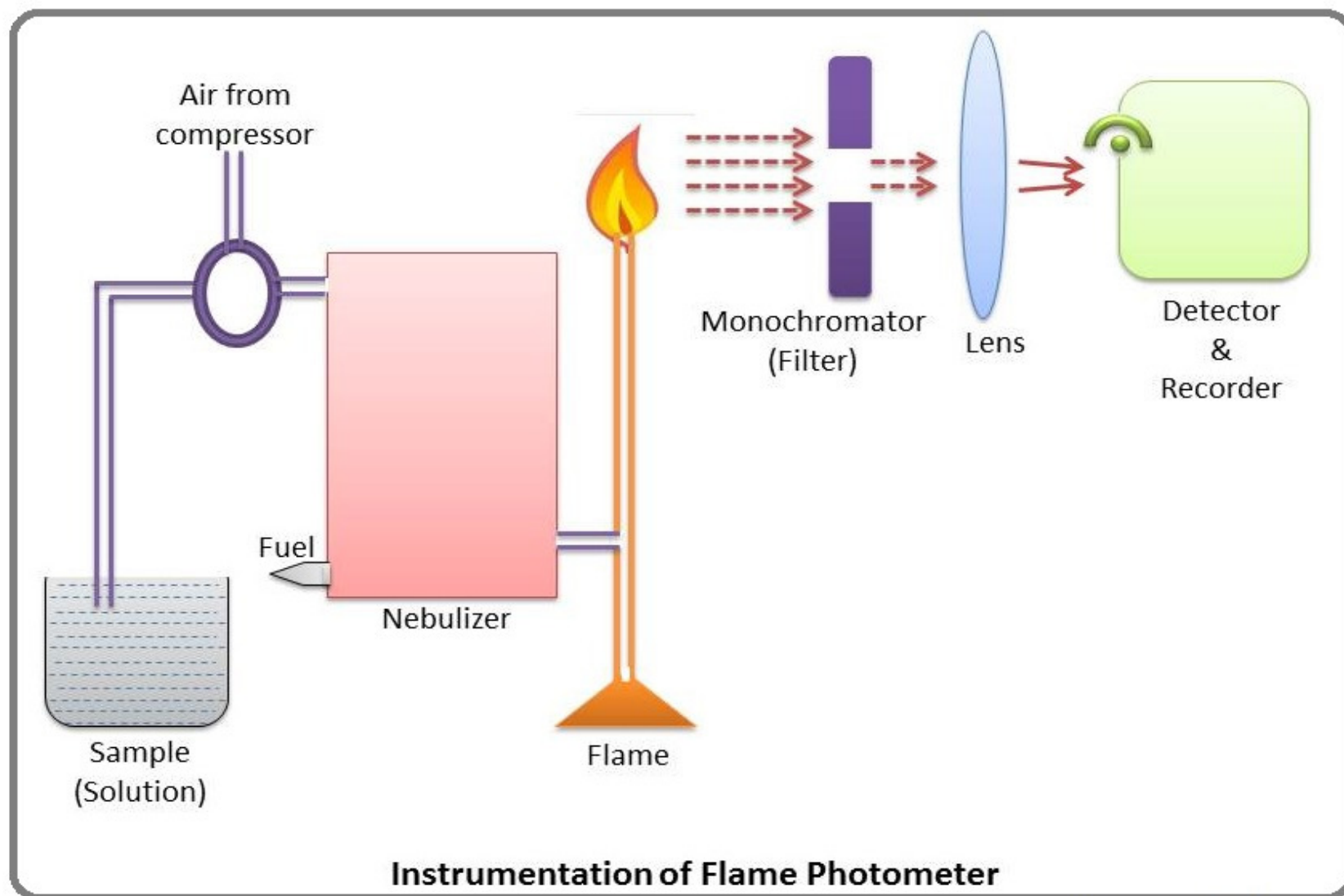
Principle

- Flame heat excite electrons of the an atom
Electrons became unstable in this excited state
Electron goes in higher energy state
Then give up their excess energy
In the form of specific wavelength
Then back to ground state



EP902

FLAME PHOTOMETER



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Parts

1. Main unit:

- Atomizer
- Mixing chamber
- Burner
- Optical filters
- Photo detector

2. The compressor :

it delivers oil free compressed air to the atomizer

Two digital displays

- Air regulator
- Gas regulator
- Gas pressure gauge

- **Source of Flame**

A burner that provides flame and can be maintained in a constant form and at a constant temperature.

- **Nebulizer and Mixing Chamber**

Helps to transport the homogeneous solution of the substance into the flame at a steady rate.

- **Optical System (Optical Filter)**

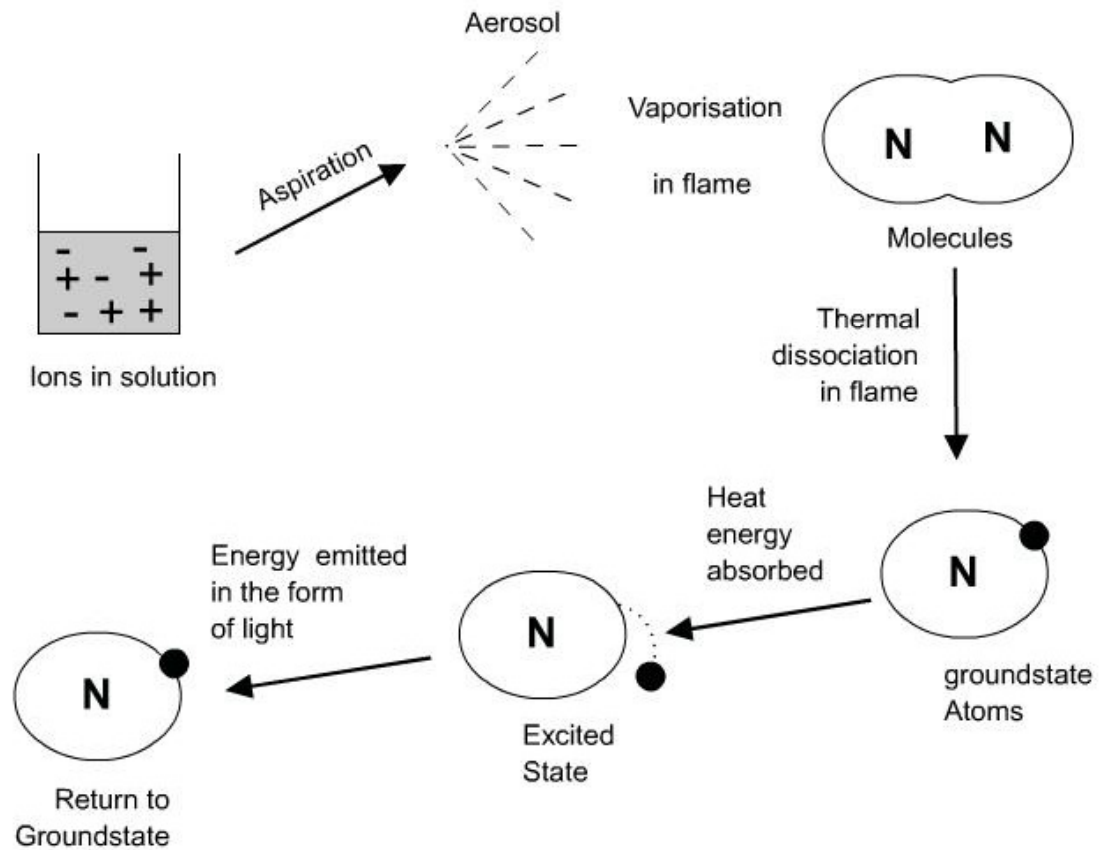
The optical system comprises three parts:

- Monochromatic filter - mono means “single” and chroma means “color” that pass only selectable narrow band of wavelength of light .
- convex mirror- emitted light transmit and focus to the lens.
- convex lens- the refracted rays focus at one point

- **Photo Detector**

- Detect the emitted light and measure the intensity of radiation emitted by the flame. That is,
- the emitted radiation is converted to an electrical signal with the help of photo detector.
- The produced electrical signals are directly proportional to the intensity of light.

Process



- The solution under test is passed carefully, under controlled conditions.
- When a solution of is sprayed as fine droplets into a flame
- Due to heat of the flame, the droplets dry and convert in to fine residue.
- Due to the heat of flame the electrons of atoms excited and then return in to ground state
- When electrons return in its ground state emits specific wave length.
- This wavelength is specific for every atoms. Like for Sodium (Na) 589nm yellow radiation,

- The intensity of emitted light is related to the concentration of the element.
- This emitted wavelength is detected by a photo detector.
- The wavelength of color tells us what the element is (qualitative).
- The color's intensity tells us how much of the element is present (quantitative).

ADVANTAGES

- Simple quantitative analytical test based on the flame analysis.
- Inexpensive.
- Quite, convenient, selective and sensitive to even parts per million (ppm) to parts per billion (ppb) range.

DISADVANTAGES

- The concentration of the metal ion in the solution cannot be measured accurately.
- More interference from serum color & turbidity compare to ISE.
- It is difficult to obtain the accurate results of ions with higher concentration.
- The elements such as carbon, hydrogen and halides cannot be detected due to its non-radiating nature.

THANK YOU