**Principle of AES**

In atomic emission spectrometry (AES) a reproducible and representative amount of the sample is introduced into an atomization-excitation source where it is converted into atomic vapours of the analyte in excited state. You would recall from Unit 7 on flame photometry that the analyte solution, when introduced into the flame, undergoes a number of processes to be atomised and then get excited. As the excited state is short lived, the excited atoms return back to the ground state after a very short lifetime (typically 10− 6 to 10− 9 s). This is accompanied by the emission of electromagnetic radiation, normally in the form of light in the UV-VIS region. This radiation is characteristic of the constituents of the sample. Due resolution of the emitted radiation generates an emission spectrum, whose detailed analysis can be exploited to obtain qualitative as well as quantitative details of the analyte. The versatility of AES is due to the availability of a wide range of atomisation-excitation sources.

It is a simple, rapid and inexpensive method for routine analysis of alkali and alkaline earth metals like, sodium, potassium, lithium, calcium and barium in environmental, clinical and biological samples especially in biological fluids and tissues. You know that in flame photometry natural gas and air flame is employed for atomisation and excitation of the analyte. As the temperature of the flame is not high enough to excite transition elements and non metals; the technique is quite restrictive. It can be efficiently employed for the detection of alkali and alkaline earth metals only.

**Instrumentation**

The essential components of a plasma based atomic emission spectrometer are as given below.

• Plasma source: an atomisation-excitation device

• Nebuliser : a sample introduction device

• Monochromator: a dispersion device

• Detector: a radiation detection device

• Processing and readout device

