

UCB008 - APPLIED CHEMISTRY



Infra-red Spectroscopy Series Lecture - IV

IR Spectroscopy - Instrumentation

by

Prof. Ranjana Prakash

School of Chemistry and Biochemistry

Thapar Institute of Engineering and Technology

Patiala -147004, India

Learning Outcomes

At the end of this session participants should be able to:

- Relate principles of IR with its instrumentation

Instrumentation - IR

- **IR Source**
- ...should give a continuous and high radiant energy output over entire IR region

Globar – Rod of silicon carbide, electrically heated – 1200°C



Nernst Glower – Mixture of oxides of Yt, Zr and Th molded in the shape of rod – electrically heated upto 1900°C



Instrumentation - IR

- Sample Handling
- *For gases and liquid samples*
- Commercial cells made up of alkali metal halide (NaCl) are used
- NaCl is hygroscopic and should be protected from moisture

Instrumentation - IR

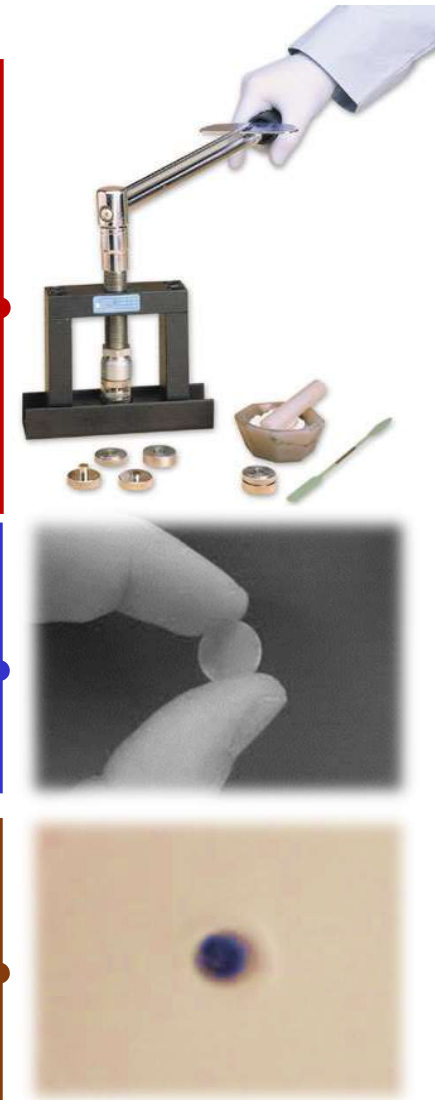
- Sample Handling
- ***For solid samples – KBr Disc technique***
- Can be analyzed as alkali metal halide (KBr) mixture
- Sample should be free from moisture

Solid sample (0.1-0.3%) + KBr (powdered) → pressed in dye (under vacuum) → 8 ton pressure for 5 mins; 10 ton pressure for 1 min

↓
13 mm disc

↓
IR examination

- A pure KBr disc should be used as reference material



Instrumentation - IR

Globar



IR
source

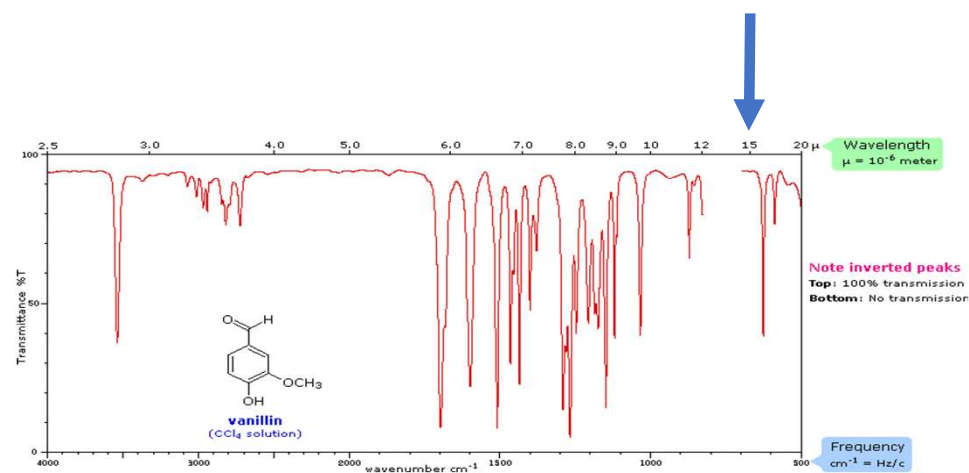


Nernst Glower

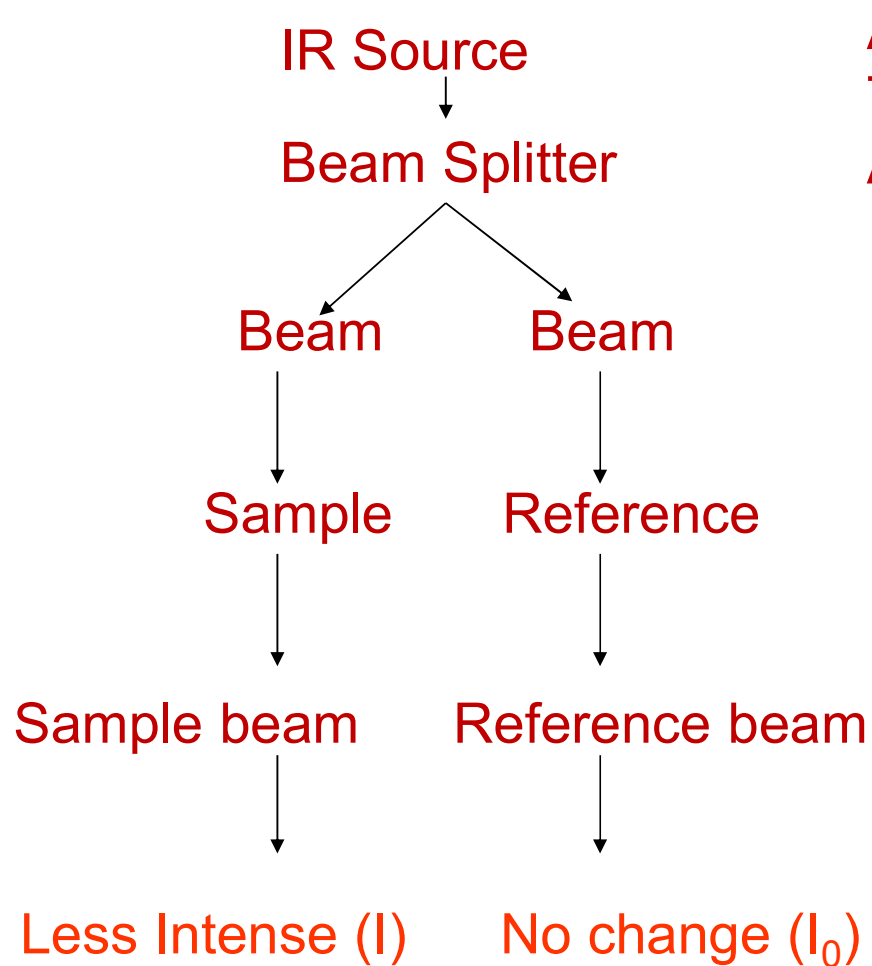
$$A = \log I_0 / I$$

$$T = I / I_0$$

$$A = \log 1 / T$$



Instrumentation - IR



$$A = \log I_0 / I$$
$$T = I / I_0$$
$$A = \log 1 / T$$

In the next session.....

- Interpretation of IR spectra