

FACTORS AFFECTING FLUORESCENCE INTENSITY

Presented by;

*Aiswarya . A. T,
First year M.Pharm,
Department of Pharmacy Practice,
Grace college of Pharmacy.*

For a molecule;

The ability & extend of fluorescence or phosphorescence depends upon 2 major factors.

1

Intrinsic structure of a molecule

2

Environment of a molecule

Intrinsic structure of a molecule

Conjugation

Unsaturated molecule

↓
absorption of UV/visible radiation

↓
fluorescence

Aromatic, Aliphatic & Alicyclic compounds

Aromatic– No. of rings ↑ FI ↑

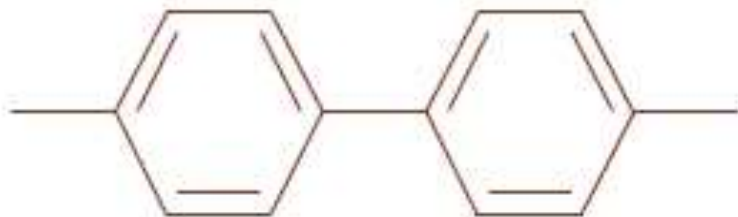
Nature of substituent group

EDG's- FI \uparrow

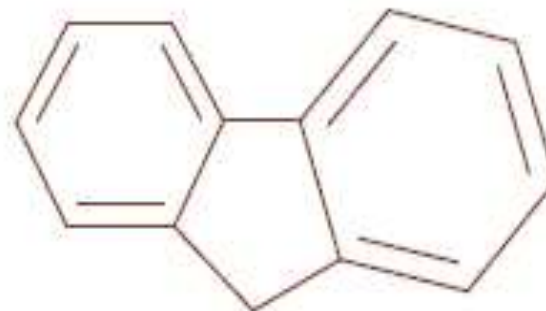
EWG's- FI \downarrow

| | |
|-------------------------------|---|
| Groups increases FI | NH_2 , OH, OMe, OEt, CN, NHR, NH_2 , NR_2 , NO, NO_2 |
| Groups decreases FI | COOH, CHO, COR, COOR, SH, F, Cl, Br, I |
| Groups having no effect on FI | SO_3 H, NH_4^+ , Alkyl grp |

Rigidity of the structure

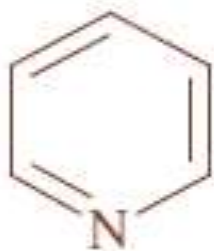


Biphenyl **Flexible-
less FI**

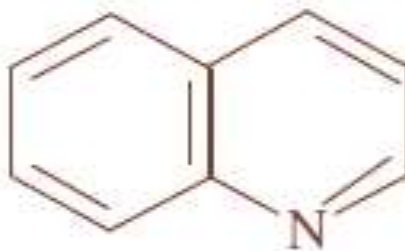


Fluorene **Rigid- more
FI**

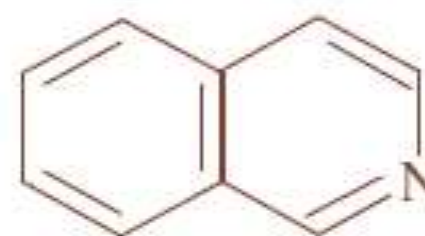
Heterocyclic compounds



Pyridine



Quinoline



Isoquinoline

No fluorescence; lone pair of e- enter triplet state by inter system crossing

Environment of a molecule

Temperature

↑ temperature – ↑ collisions – ↓ FI

Viscosity

↑ viscosity – ↓ collisions – FI ↑

Oxygen

1. Oxidise fluorescent subst. to non fluorescent
2. decreases fluorescence because of paramagnetic property of molecular energy

Polarity of solvent

reduced FI

Ph of solution

Phenols : **acidic** – undissociated– **NO** fluorescence
alkaline– dissociated– **good** fluorescence

Aniline : **acidic**– fluorescence in **visible** region
alkaline/neutral– fluorescence in **UV** region

Photochemical decomposition

no fluorescence; to avoid this, chose wavelength not strongly absorbed.

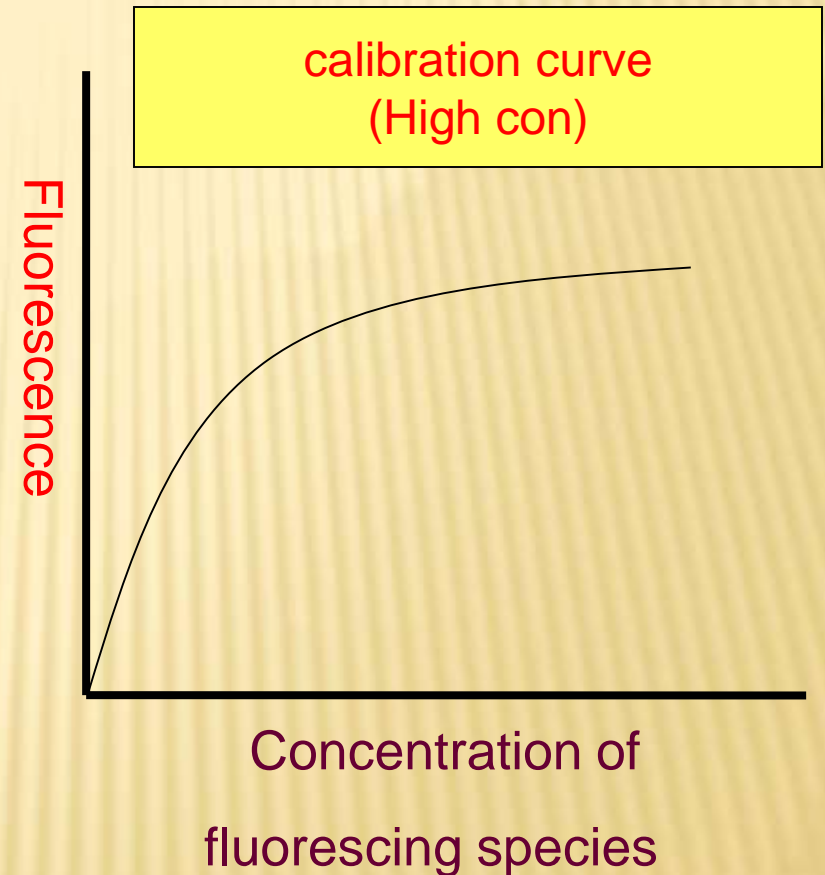
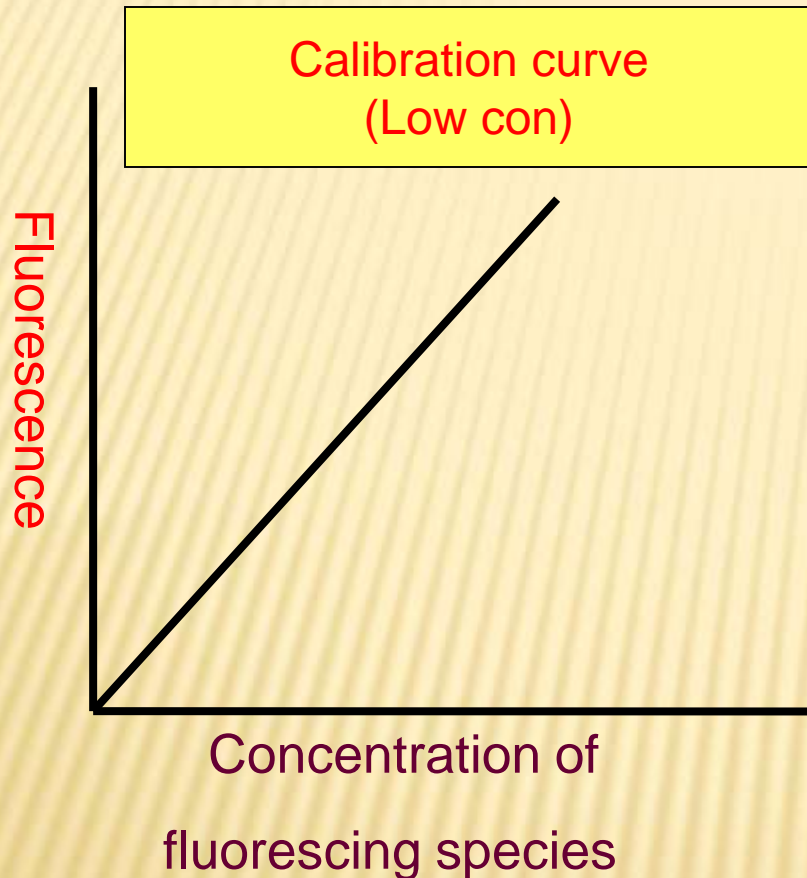
Adsorption

sensitive method– Dilute solutions are used

Light

Monochromatic light is essential for excitation

Concentration of solution



Deviations at higher concentrations can be attributed to self-quenching or self-absorption.



thank you