

# Ultraviolet And Fluorescence Spectroscopy

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from chapter \_\_\_\_\_ in the recommended text

## **A. Introduction**

## B. Fundamental Physics

more

X-ray

ground state energy level to a(n) excited

inversely proportional to the energies

directly related to their number.

broad

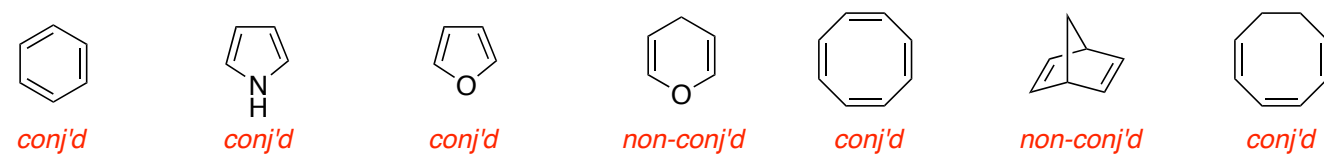
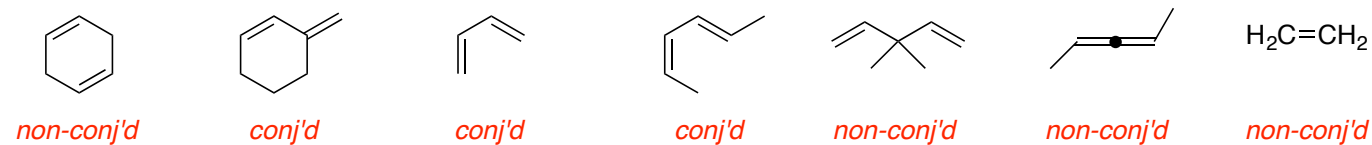
IR-vibrational

Chromophores

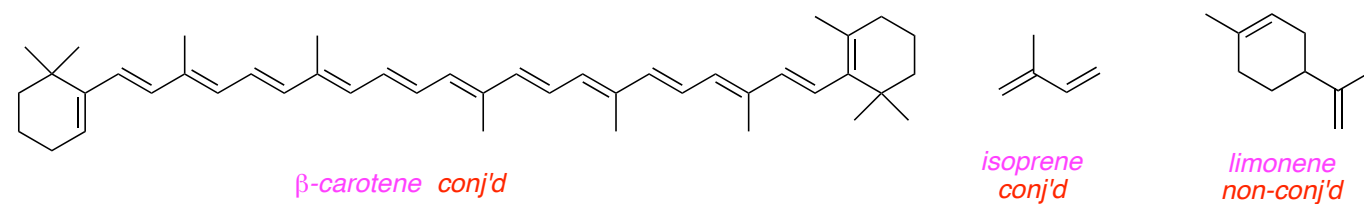
cross-section and the more

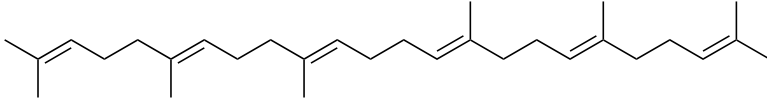
## C. Molecular Orbital Diagrams Of Alkenes, Dienes, and Polyenes

just one

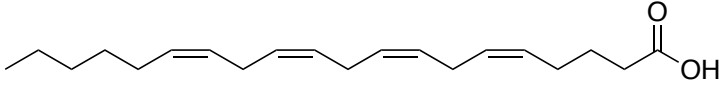


Thank you to Dr Syed Hussaini of U Tulsa who pointed out that 4H-pyran (4 th example) is conjugated of its oxygen is  $\text{sp}^2$  hybridized.

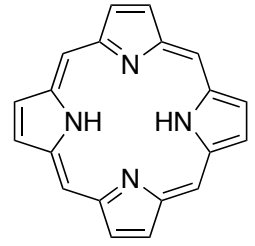




*squalene non-conj'd*

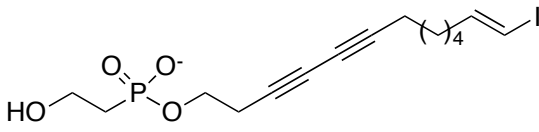


*arachidonic acid non-conj'd*

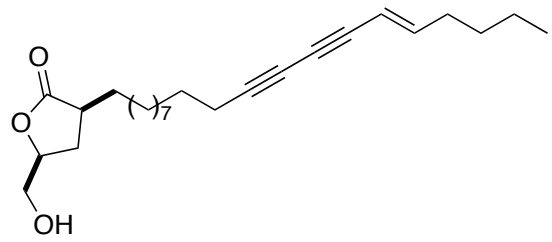


*porphyrin conj'd*

is



*phosphoiodyns A  
non-conj'd*



*debilisone  
conj'd*

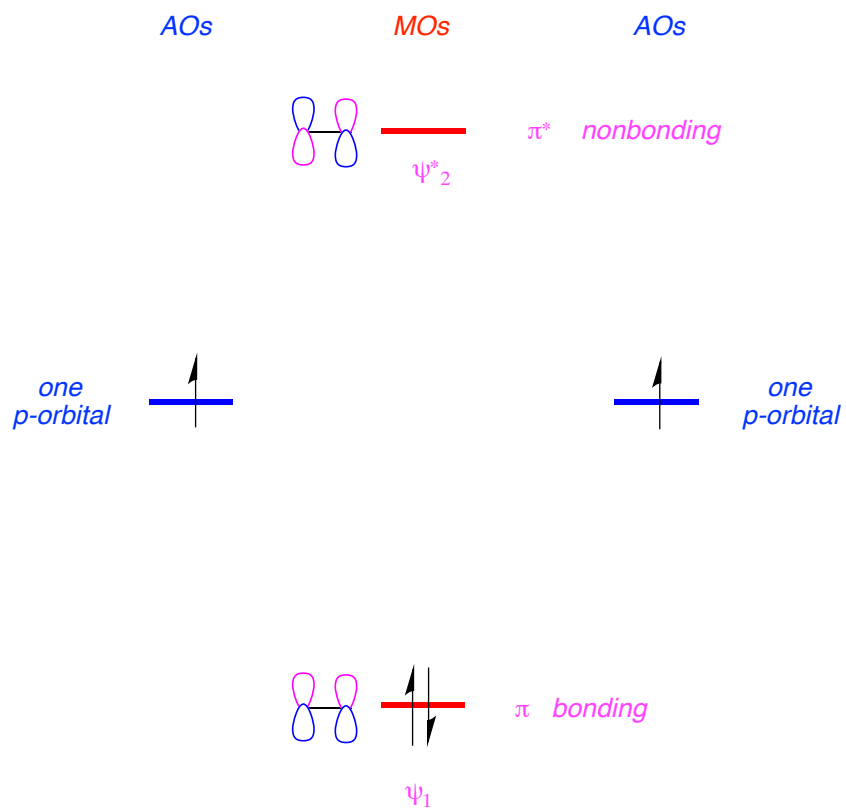
an alternative to

n

2

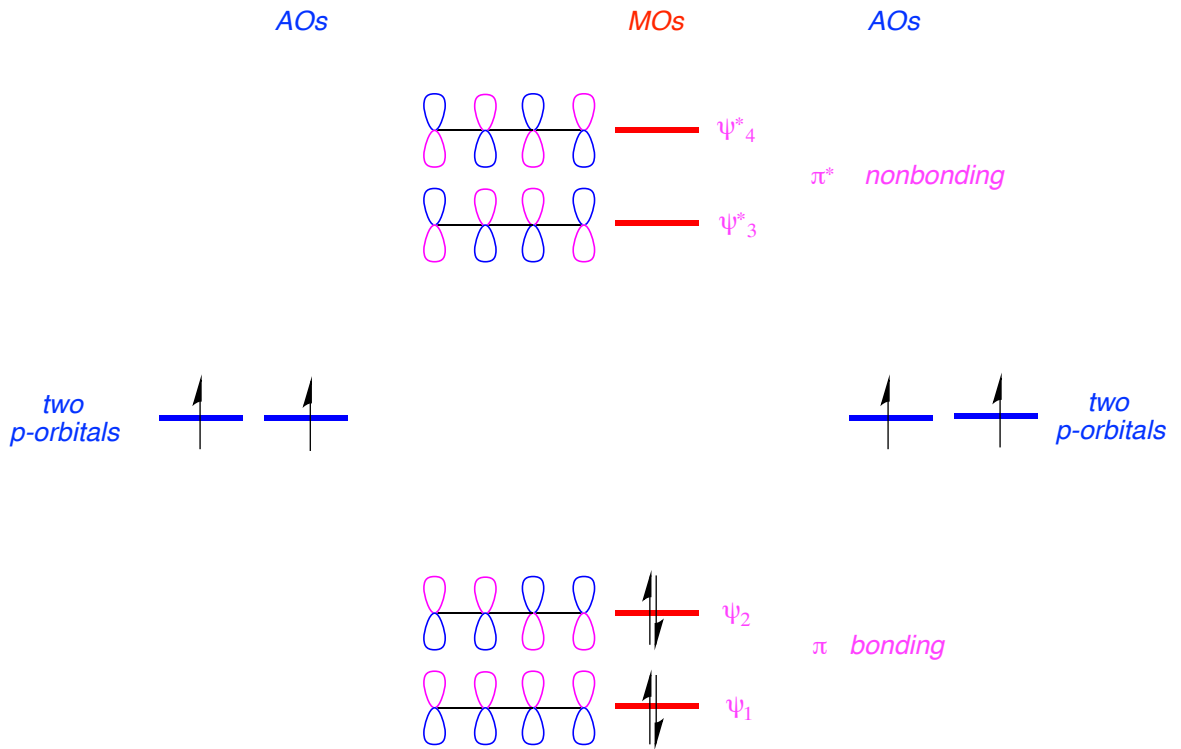
bonding  $\pi$ - and antibonding

Maximal



ultraviolet region resulting in an excited  
IR energy

larger cross-sections, therefore they absorb more  
absorbance of the chromophore  
larger



decreases

lower energy quanta of increased

vibrational energy states, while electronic

IR

UV quanta.

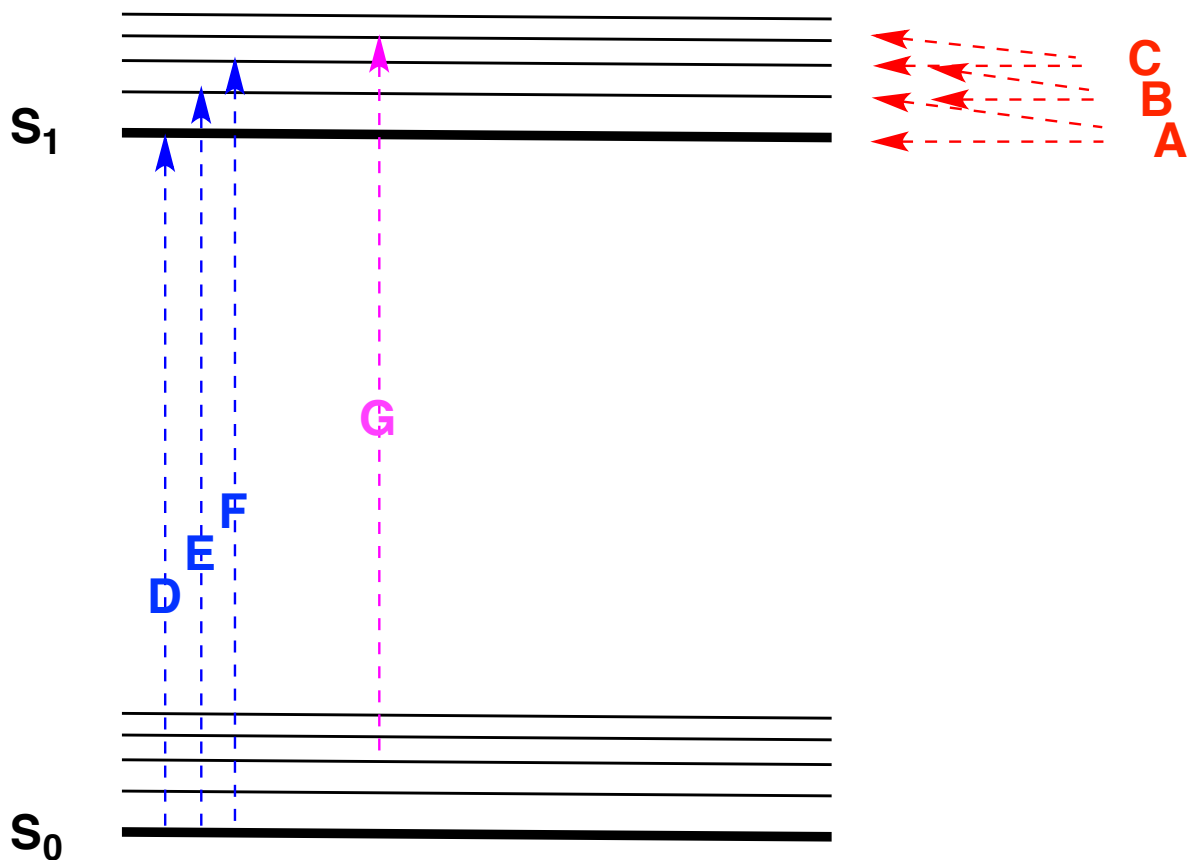
UV

IR.

IR

UV

greater than for transitions like **G**.



multiple

smaller

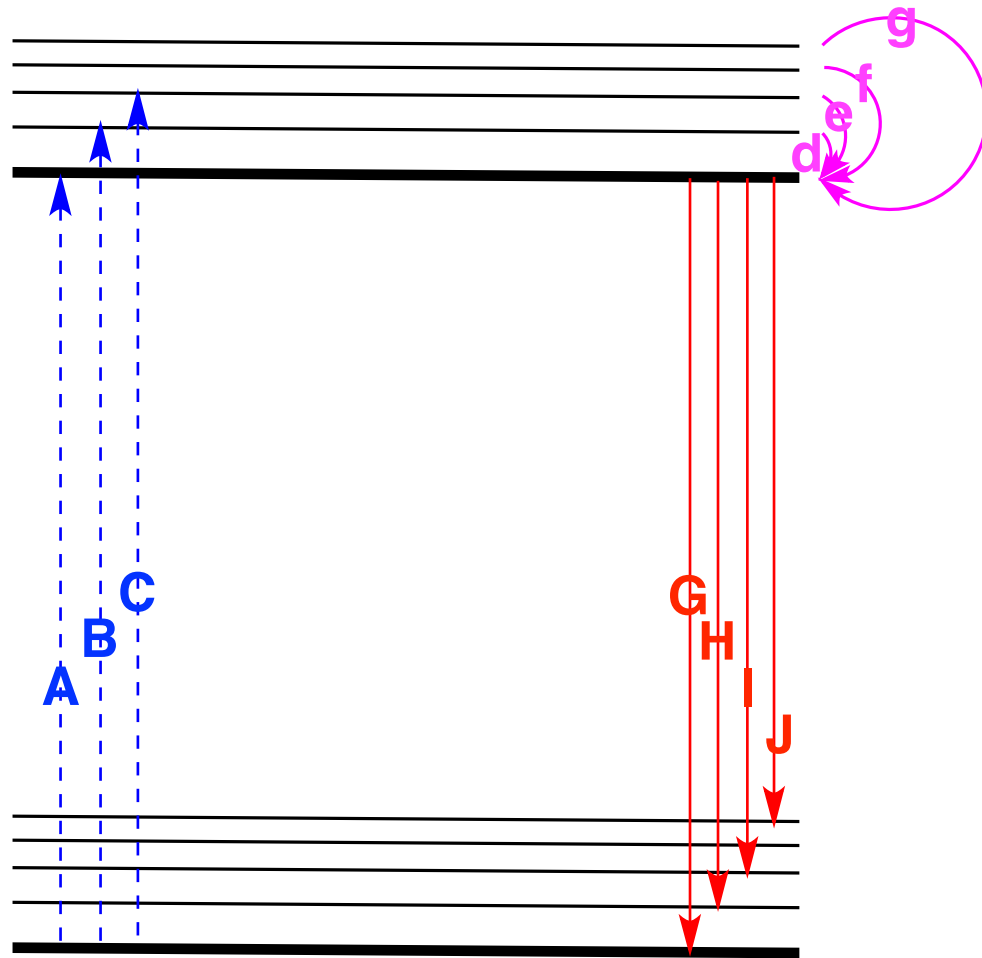
UV and transitions between electronic

IR emissions.

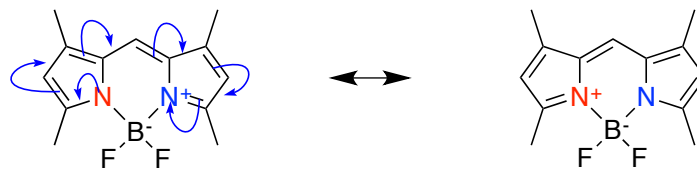
nano-second

fluorescent radiation

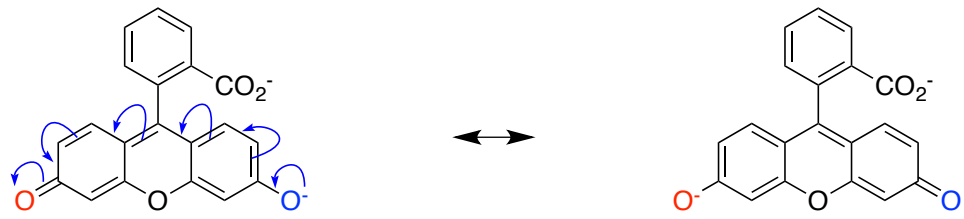
rigid molecules



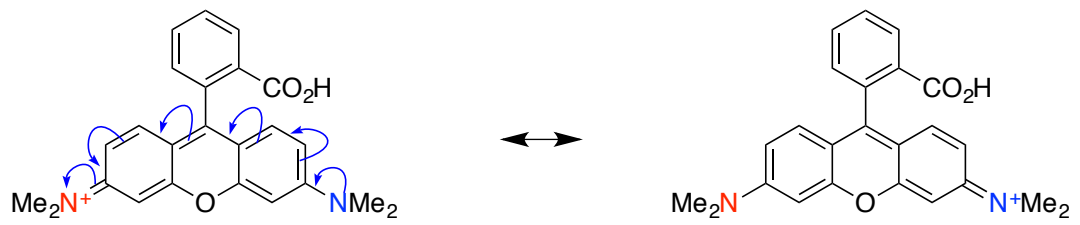
sensitive  
higher  
higher  
fluorescence spectroscopy  
fluors.  
less  
rigid



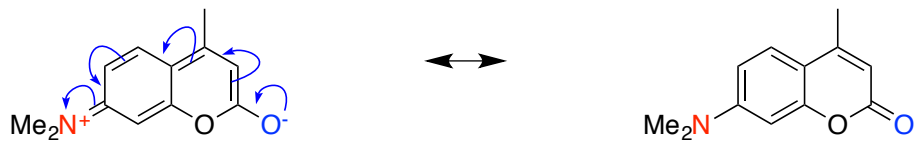
a BODIPY



*a fluorescein*



*a rhodamine*



*a coumarin*

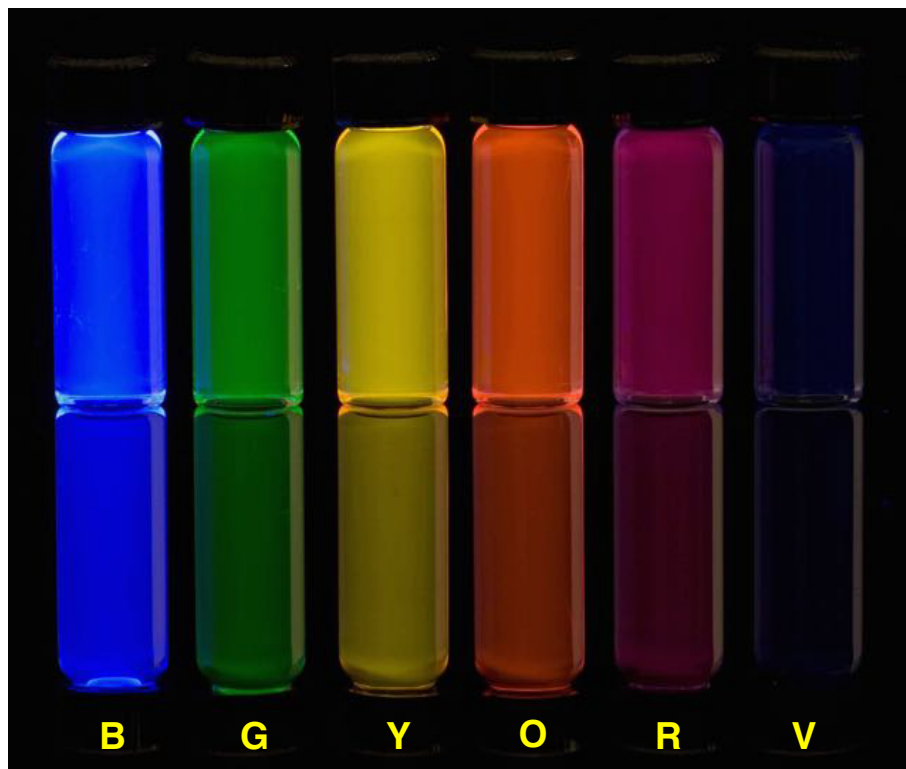


Of the probes shown above, the ones which has fluorescence that is most sensitive to reduced pH is the fluorescein and coumarin, whereas the BODIPY is least sensitive to pH.

This is because fluorescein and coumarin contain phenoate- $O^-$  groups that can be protonated as the pH is reduced from 7.0.

Fluorescence of the coumarin is likely to be most sensitive to the dipole moment of the solvent it is in because the oscillation of charge in this molecule is unsymmetrical.

Which of the fluor solutions below emit the highest energy light V, and which of them emit at the longest wavelength R.



Circle the correct definition of fluorescence quantum yield from the following choices:

$$\frac{\text{\# photons absorbed}}{\text{\# photons emitted}}$$

$$\frac{\text{\# photons emitted}}{\text{\# photons absorbed}}$$

$$\frac{\text{\# photons lost as heat}}{\text{\# photons absorbed}}$$

Circle the correct descriptor of fluor brightness:

quantum yield x absorbance at excitation wavelengths

absorbance at excitation wavelengths only

quantum yield only

quantum yield x absorbance at  $\lambda_{\text{max}}$

absorbance at  $\lambda_{\text{max}}$  only