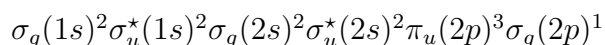


Quiz 11.4 – Electronic Spectroscopy

Name: _____

Electronic Term Symbols

Give the term symbol for the excited state of C_2 with the following electronic configuration:

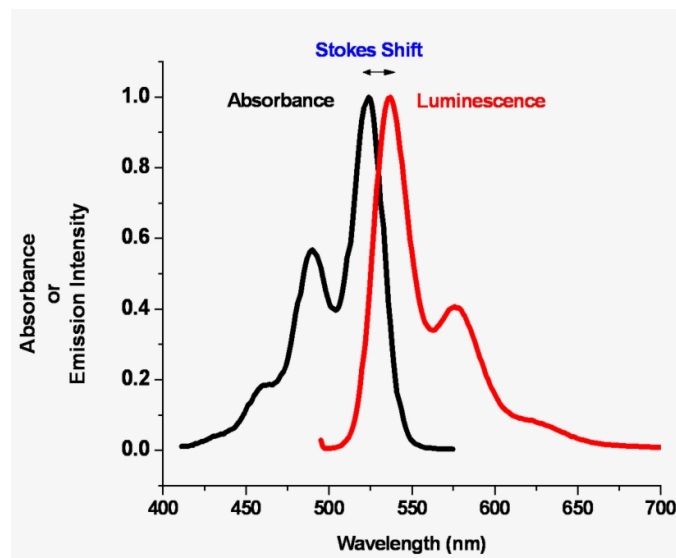


List all selection rules for electronic transitions

Franck Condon Factors

An electronic excitation significantly weakens and lengthens a chemical bond. Which vibrational state of the excited electronic state is likely to show the strongest transition? (Generally, I'm not looking for a particular value of v')

The absorption and fluorescence spectra below show a few vibronic transitions. Give each peak a label indicating the initial and final vibrational states involved in each transition. Vibrational states of the ground electronic state should be referenced by their v quantum number, and vibrational states of the excited electronic state should be referenced by their v' quantum number



Next to the spectrum above, roughly sketch the potential wells and vibrational states for the electronic states involved.

Decay Pathways

Classify each decay pathway as *internal conversion*, *fluorescence*, *phosphorescence*, or *inter-system crossing*

- $S_1 \rightarrow T_1$ (radiationless)
- $S_1 \rightarrow S_0$ (radiative)
- $S_1 \rightarrow S_0$ (radiationless)
- $T_1 \rightarrow S_0$ (radiative)
- $T_1, v' = 6 \rightarrow T_1, v' = 0$ (radiationless)

My Voice

By Rafael Campo

To cure myself of wanting Cuban songs,
I wrote a Cuban song about the need
For people to suppress their fantasies,
Especially unhealthy ones. The song
Began by making reference to the sea,
Because the sea is like a need so great
And deep it never can be swallowed. Then
The song explores some common myths
About the Cuban people and their folklore:
The story of a little Carib boy
Mistakenly abandoned to the sea;
The legend of a bird who wanted song
So desperately he gave up flight; a queen
Whose strength was greater than a rival king's.
The song goes on about morality,
And then there is a line about the sea,
How deep it is, how many creatures need
Its nourishment, how beautiful it is
To need. The song is ending now, because
I cannot bear to hear it any longer.
I call this song of needful love my voice.