

Model 5: Phosphorescence.

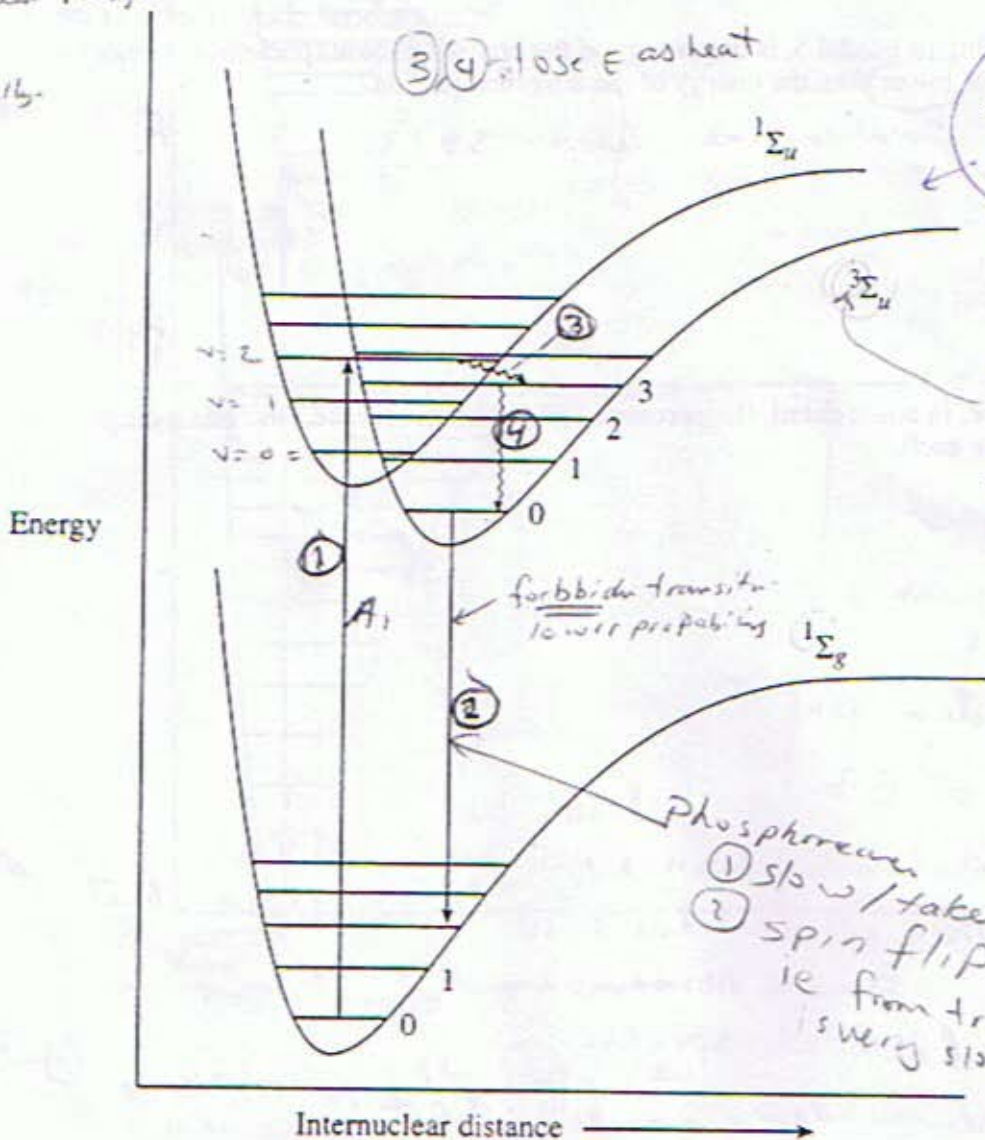
Another possibility exists for an electronically excited molecule. The excited molecule can undergo a collision (radiationless transition) that causes the spin quantum number to change (usually, this is from an $S = 0$ state to an $S = 1$ state); this is called **intersystem crossing**. The transition back to the ground state is now forbidden and the molecule is **trapped** in the excited state. It will, of course, lose vibrational energy and most likely wind up in the $v = 0$ vibrational level of the excited state. Eventually, the electronically excited state molecule releases a photon in a radiative transition to the ground electronic state and the spin quantum number, S , *does* change, the molecule is said to **phosphoresce** and the process is called **phosphorescence**. Phosphorescence typically occurs at 10^{-3} to 10 seconds after absorption of a photon.

① first e absorbs E

② get excited

③ then the molecule will undergo collision for radiationless transition that causes the spin to change
④ now it is trapped

3 lone e that is singlet triplet
forbidden classically



2 excitator states superimposed.

A_1 goes to singlet but no change in spin
2 unpaired e if 0 is triplet
here there is a spin flip
almost happens by collision and its slow with collision.
Phosphorescence longer time spin is diff.

Pg 838 (harwood)