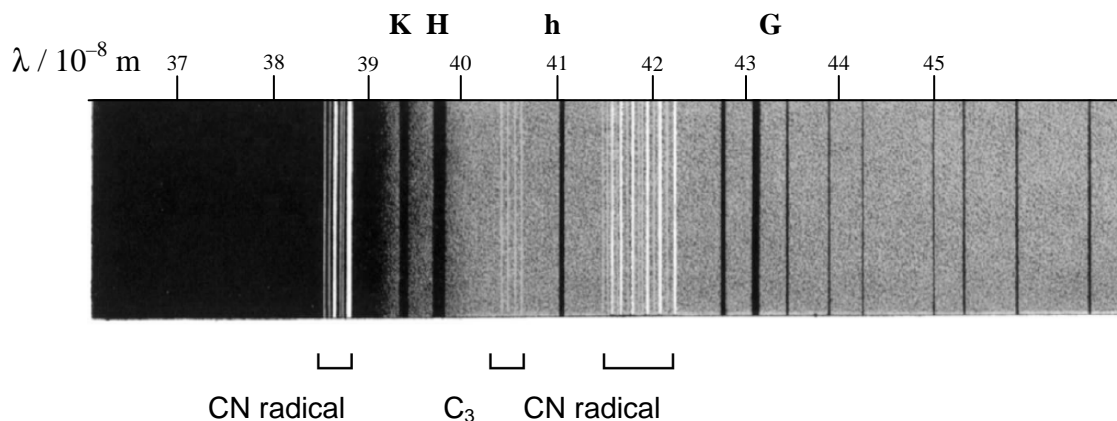


Marks
4

- The “Great Comet of 1881” was discovered by Tebbutt from his observatory at Windsor, NSW. Observations by Huggins of the comet’s emission spectrum (pictured) revealed the presence of what was later determined to be the CN radical.



This emission system of CN is known as the “violet system”, and results from a radical returning to the ground state as an electron makes a transition from a σ orbital to a σ^* orbital. The “red system” of CN results from a radical returning to the ground state as an electron makes a transition from a σ orbital to a π orbital.

On the diagram below, indicate the orbital occupancy, using arrow notation, of the upper electronic states of the “violet” and “red” systems of CN. Also indicate how the excited electron relaxes when the radical emits light (use a curved arrow).

