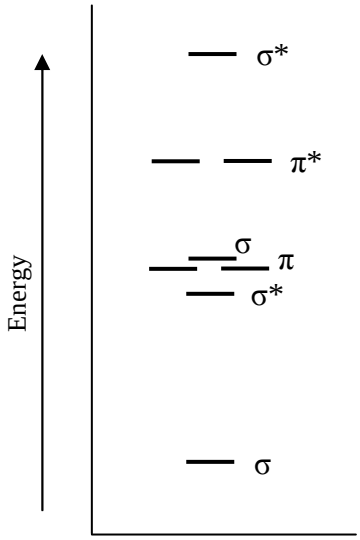
Marks 6

- Carbon forms a homonuclear diatomic molecule which is observed in comets, flames and interstellar clouds.

The molecular orbital energy level diagram provided shows the energies of the orbitals for the valence electrons in the C_2 molecule. Indicate on this diagram the ground state electronic configuration of C_2 using the arrow notation for electron spins.



In its ground state, is C_2 paramagnetic or diamagnetic?

The lowest energy excited state of C_2 possesses two electrons with parallel, unpaired spins. What is the bond order of C_2 in this excited state?

Answer:

Starting in this excited state, further exciting an electron from the lowest σ* orbital to the next lowest σ orbital brings about the doubly excited state responsible for green emission in flames. What is the bond order of this doubly excited state?

Answer: