

Answer on Question #44193-Physics-Quantum Mechanics

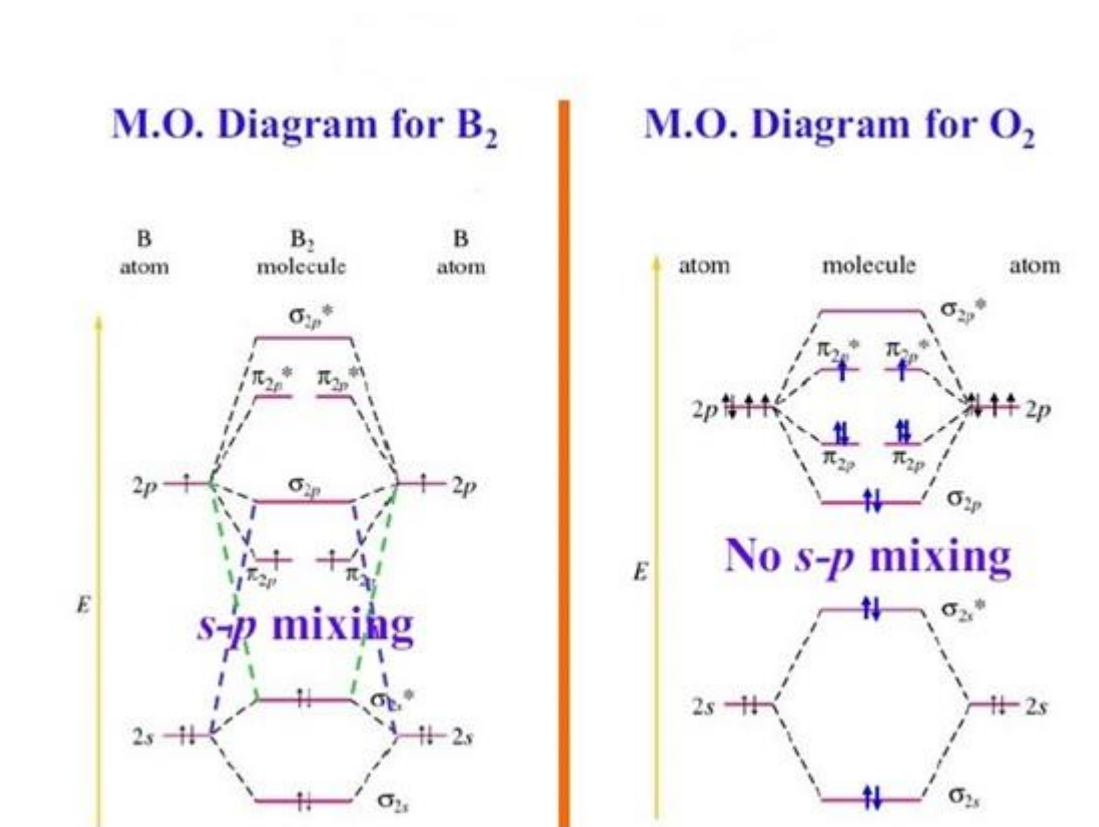
Using molecular orbital theory, draw the energy patterns of the following:

i) B₂

ii) O₂

Comments on the difference between the two patterns

Solution



B have $\frac{1}{2}$ filled 2p orbitals, but O have $> \frac{1}{2}$ filled 2p orbitals.

Having $> \frac{1}{2}$ filled 2p orbitals raises the energies of these orbitals due to $e^- - e^-$ repulsion: electrons repel each other because they are negatively charged.

If 2 electrons are forced to be in the same orbital, their energies go up.

s-p mixing only occurs when the s and p atomic orbitals are close in energy ($\leq \frac{1}{2}$ filled 2p orbitals).

s-p mixing

No s-p mixing

