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Extension
Topics for A
level
Chemistry

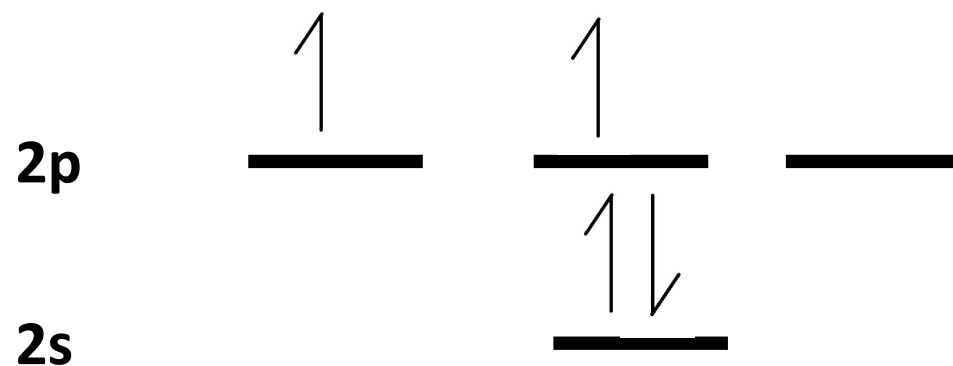
Extending Bonding theory – Orbital Hybridisation Part 2

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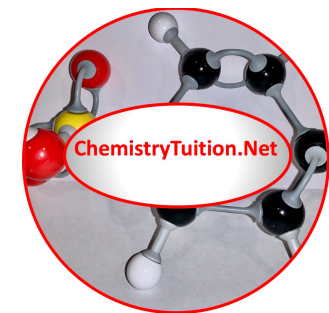
Hybridisation of Orbitals

Carbon's electronic structure is $1s^2 2s^2 2p^2$

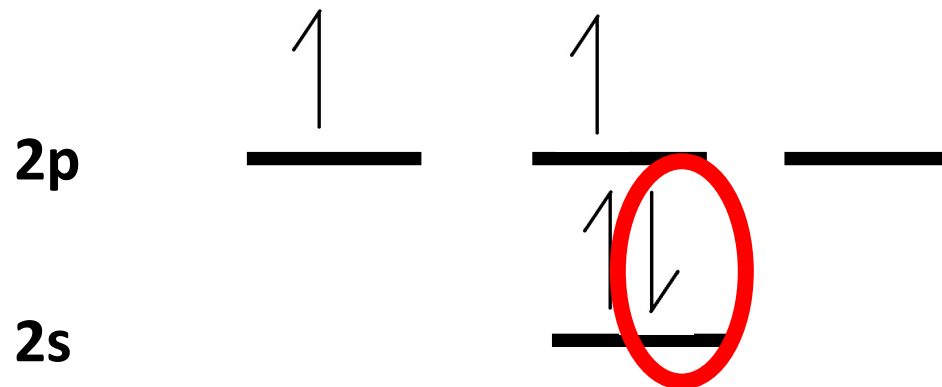
Orbitals available for bonding are $2s^2 2p^2$



There are only two orbitals which can form bonds but we know carbon forms 4 bonds.

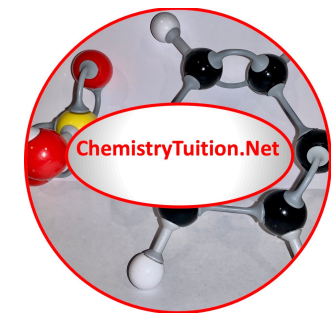
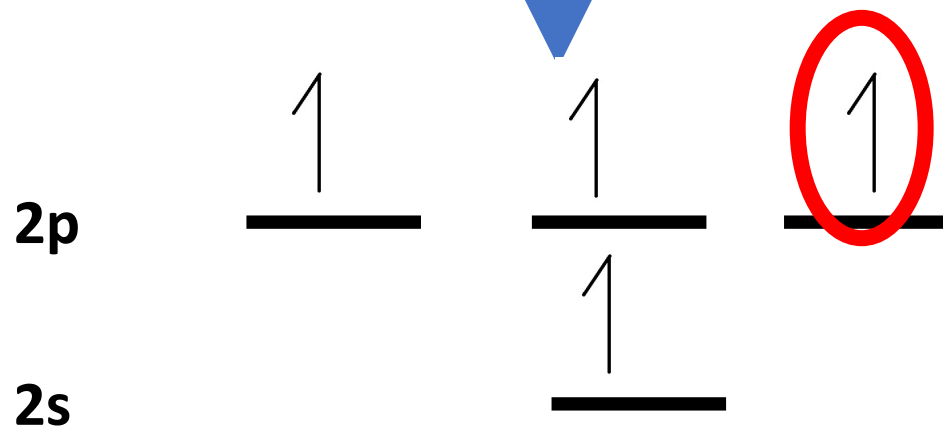


Hybridisation of Orbitals

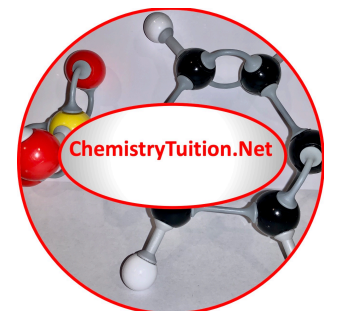
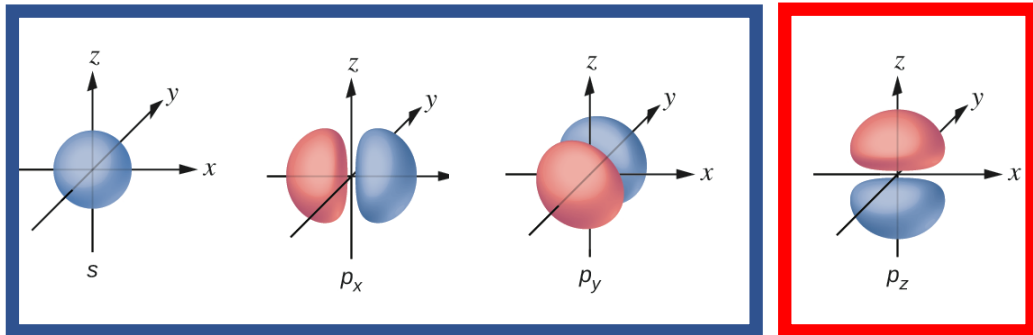
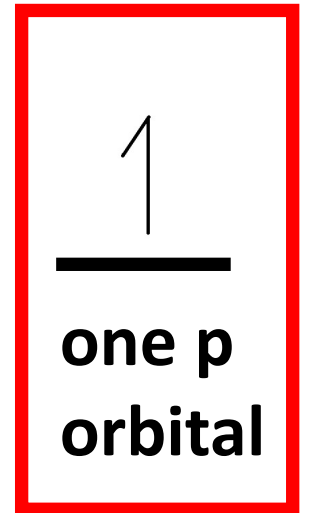
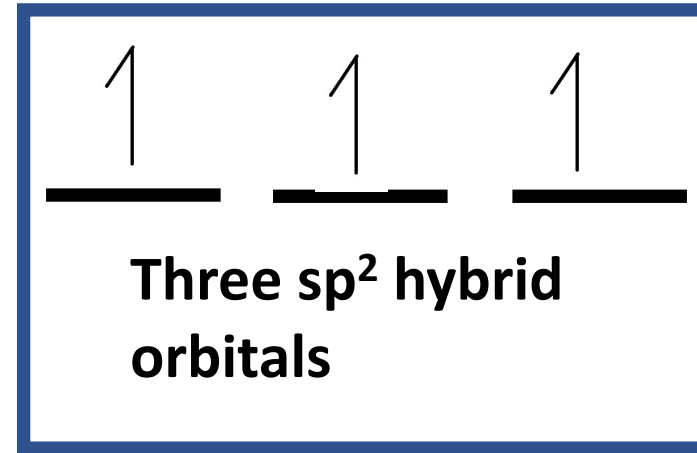
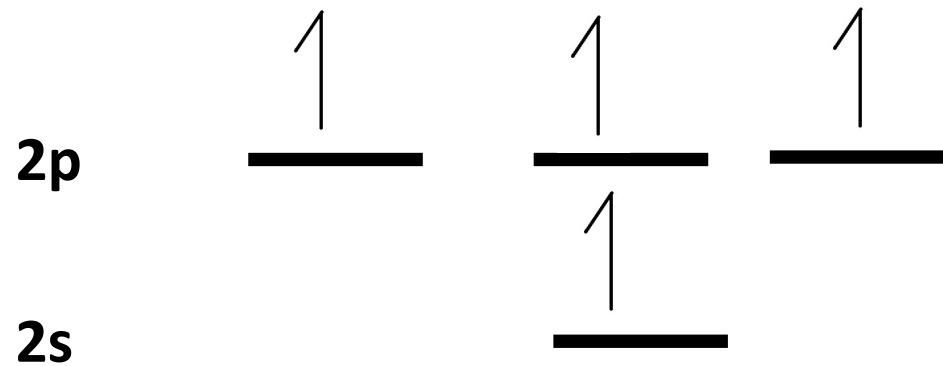


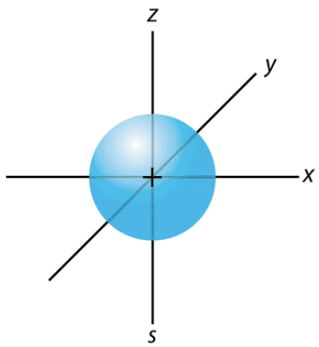
Carbon's electronic structure is $1s^2 2s^2 2p^2$

An electron in 2s is promoted to the empty 2p orbital

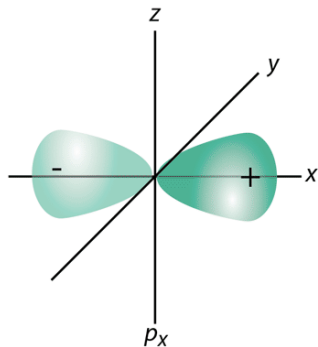


Formation of sp^2 hybrid orbitals

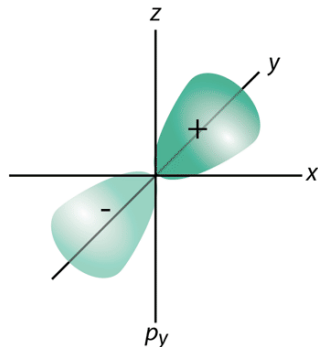




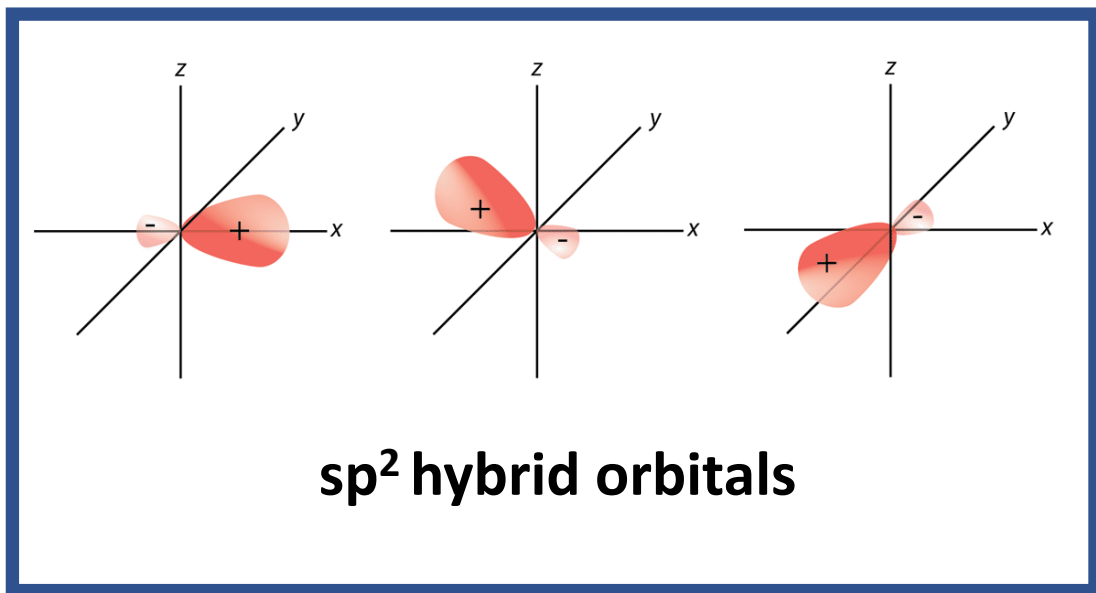
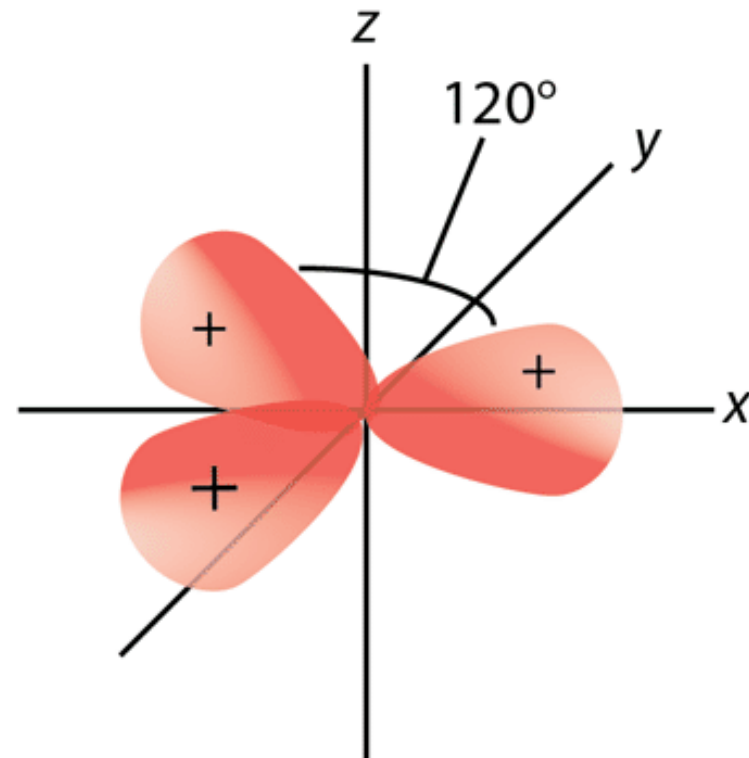
2s



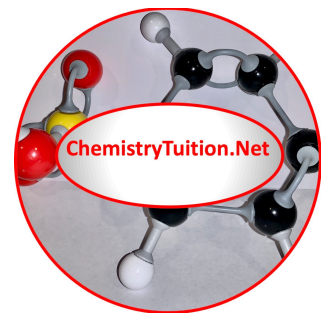
2p_x

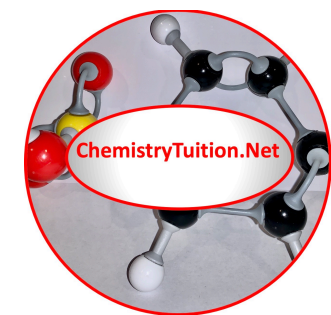
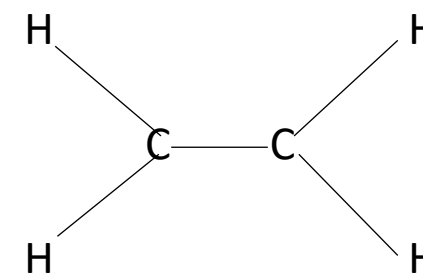
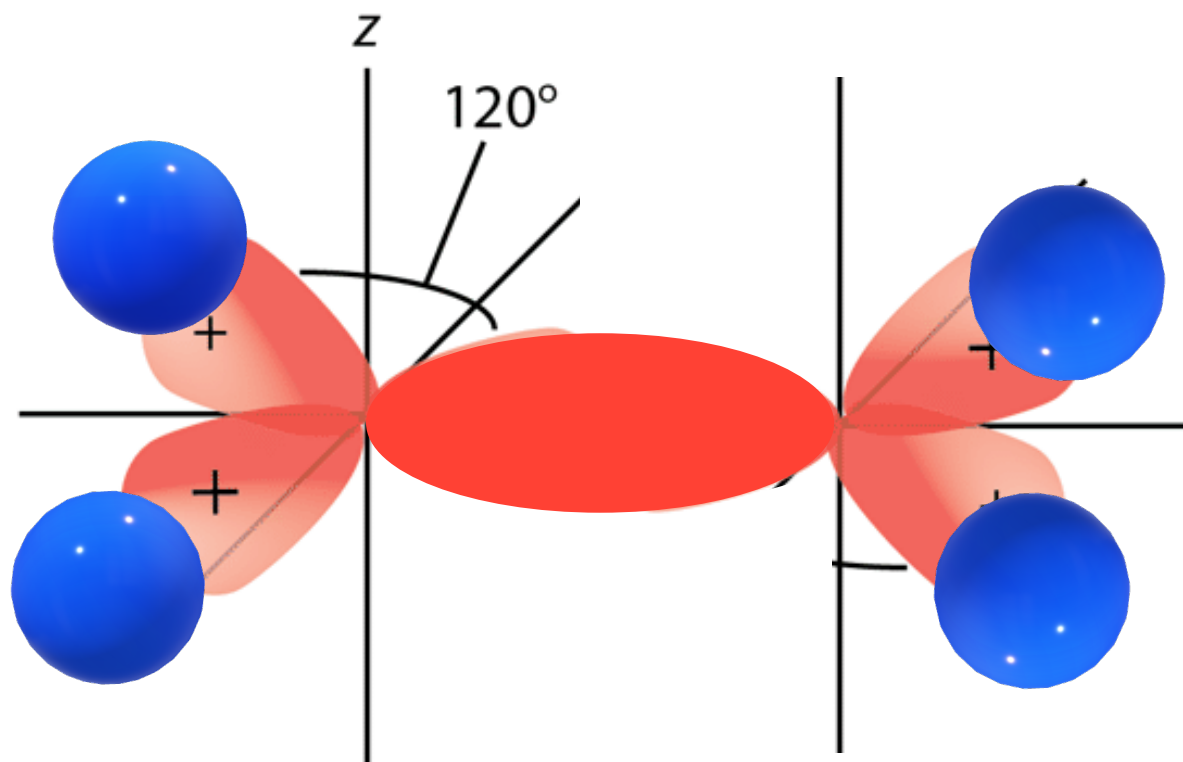


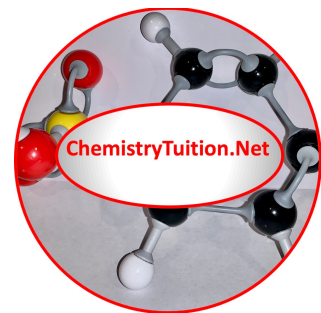
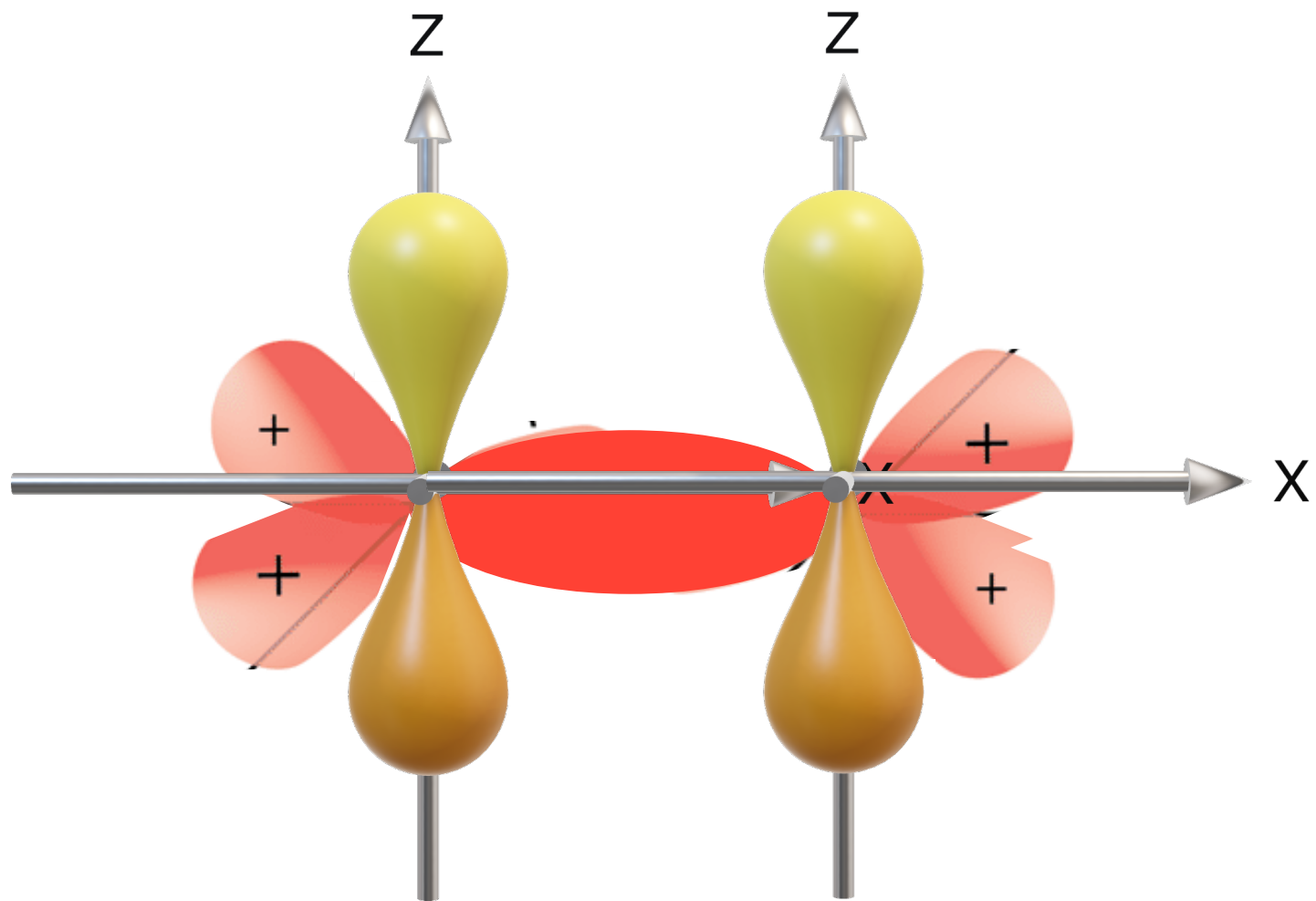
2p_y

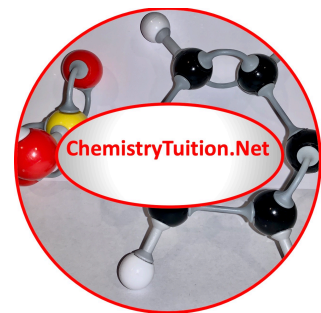
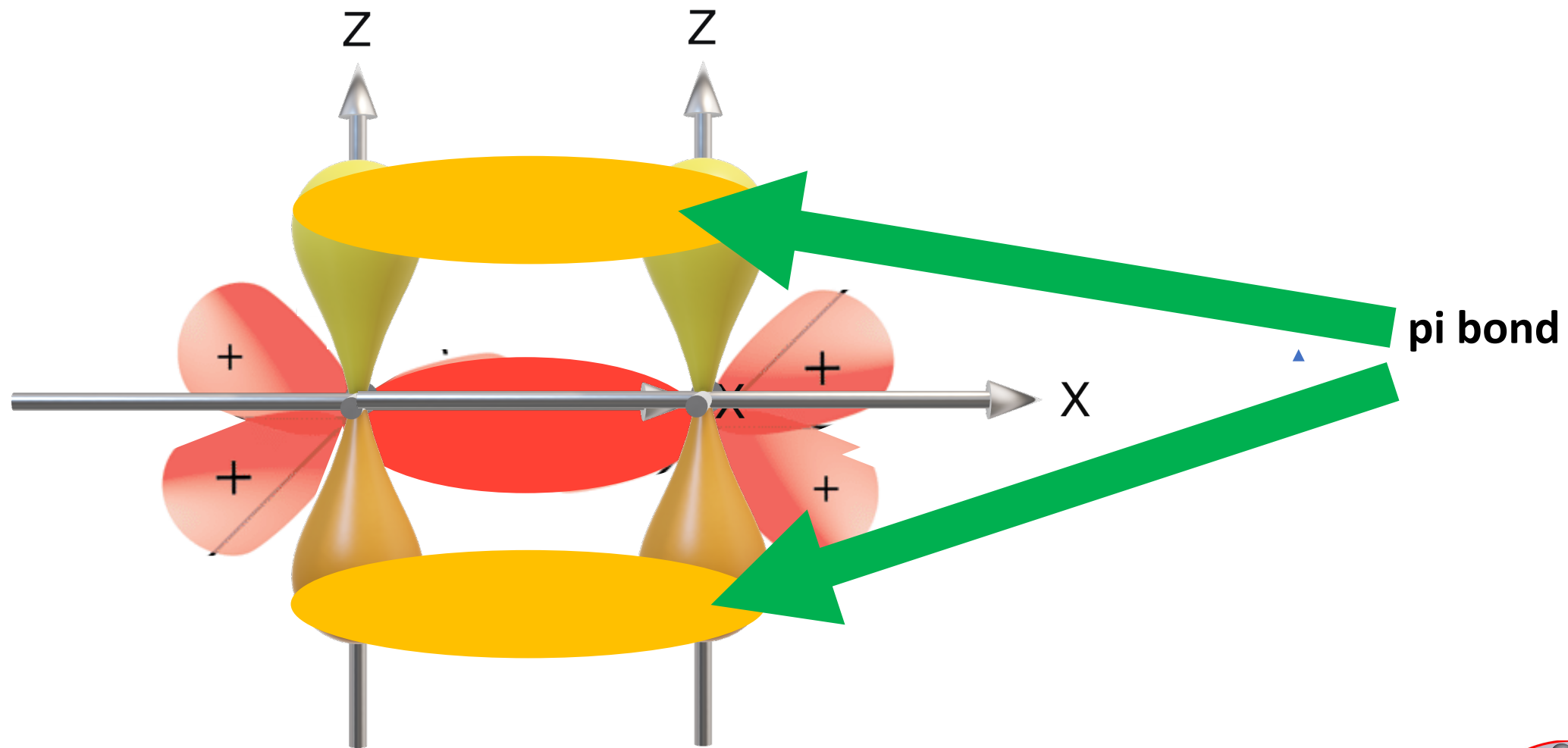


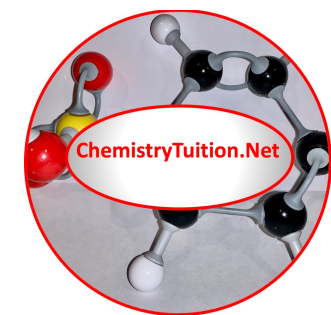
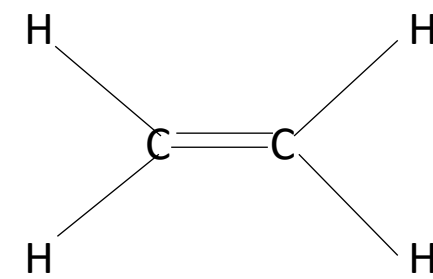
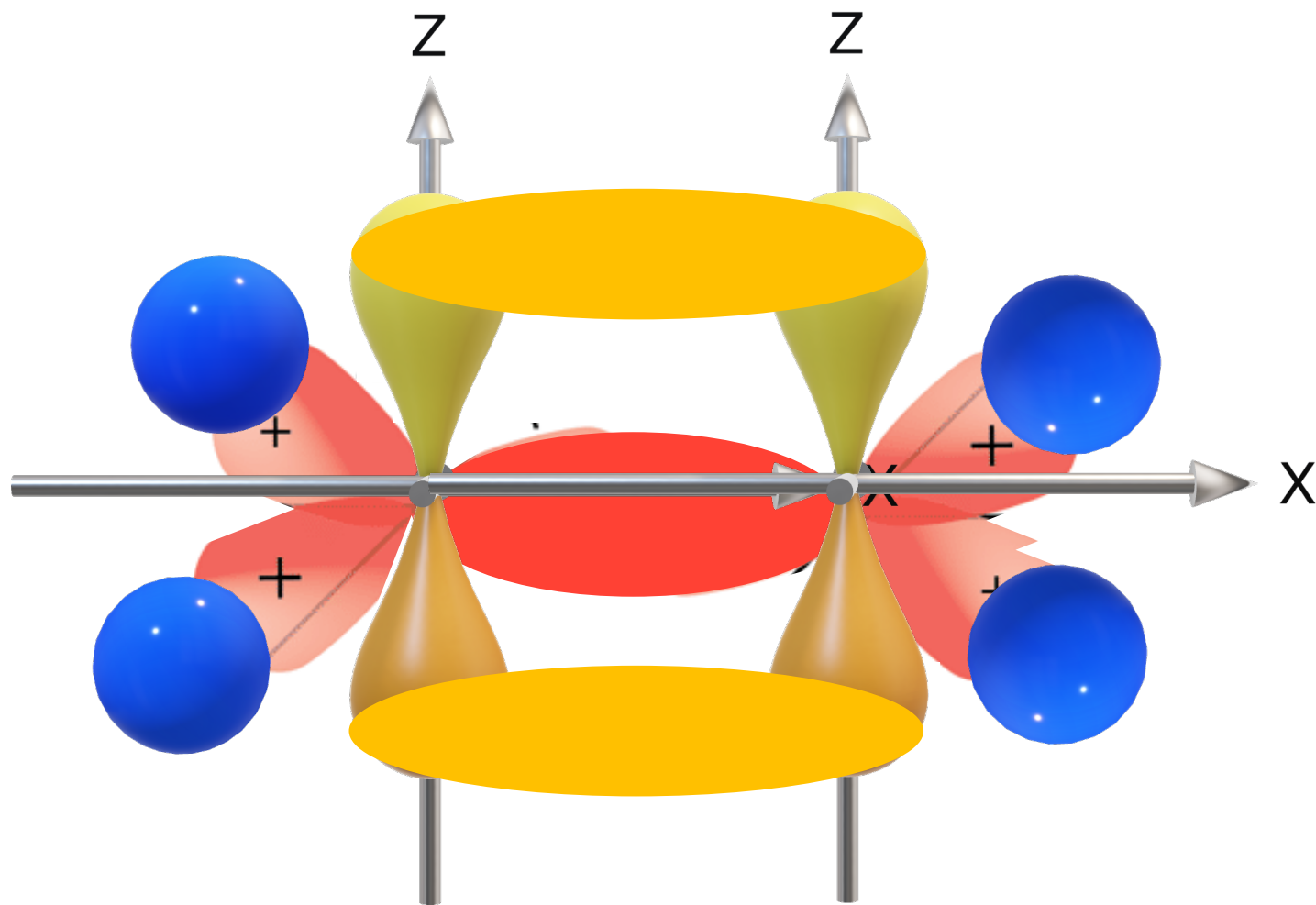
sp² hybrid orbitals



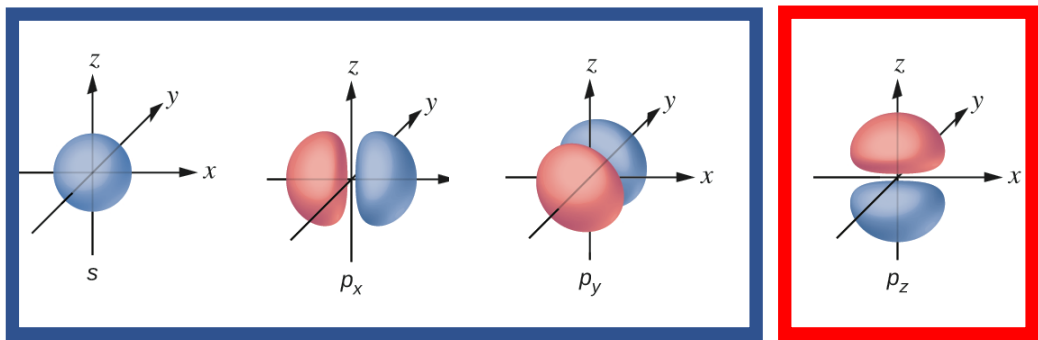
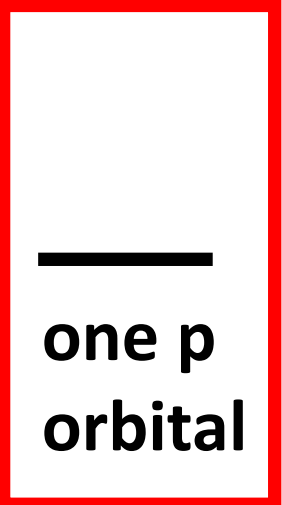
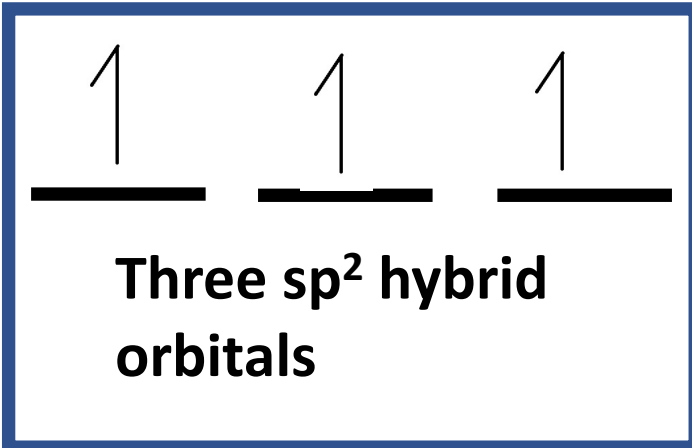
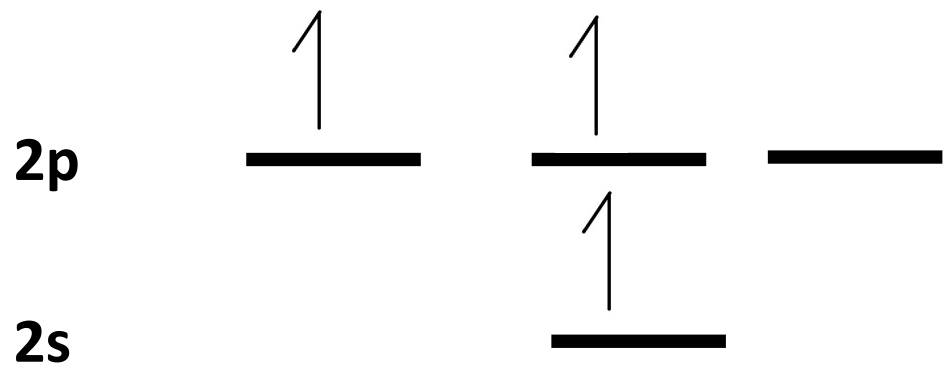




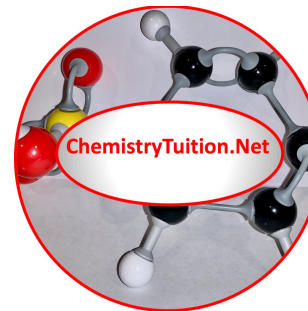


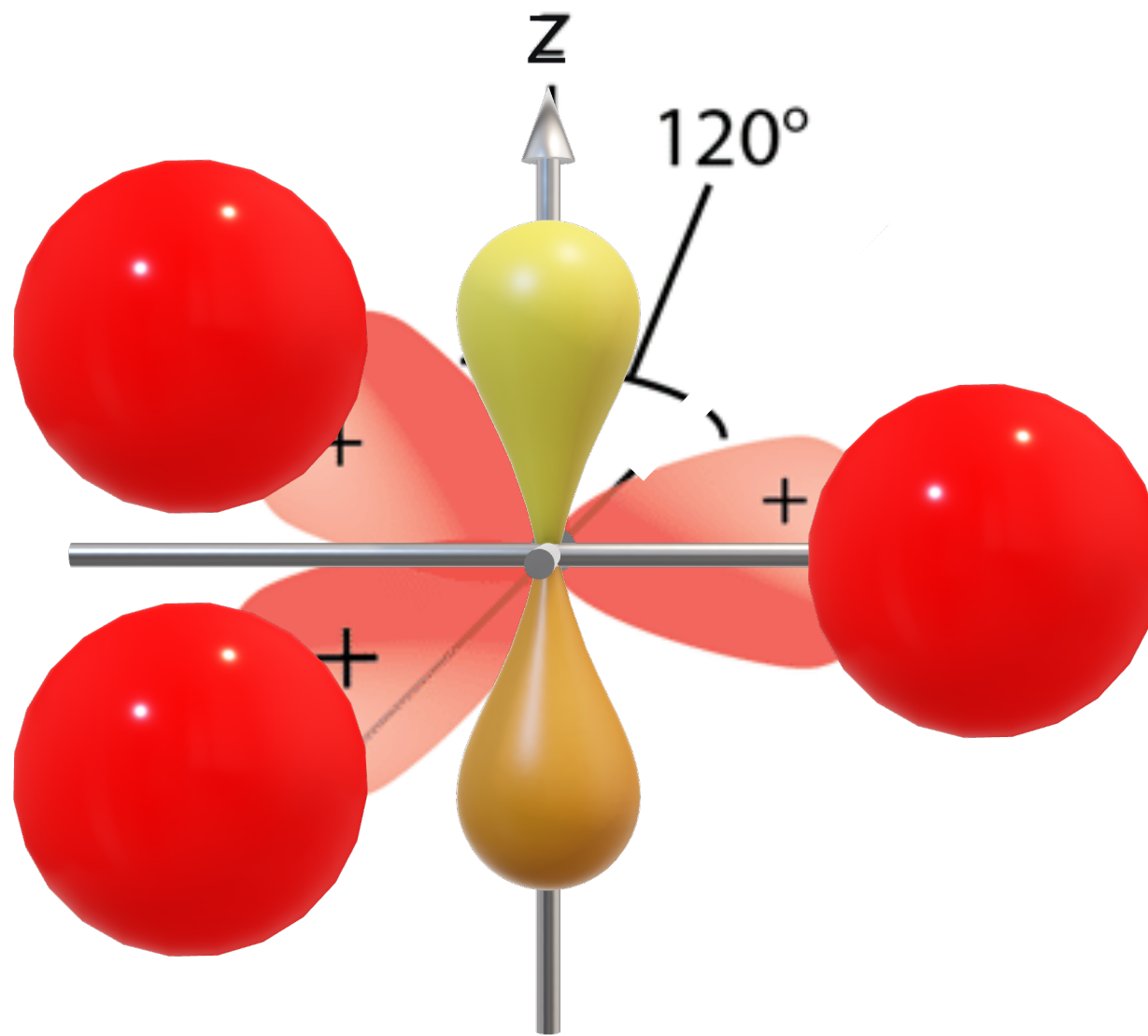


sp^2 hybrid orbitals are formed by boron in BF_3

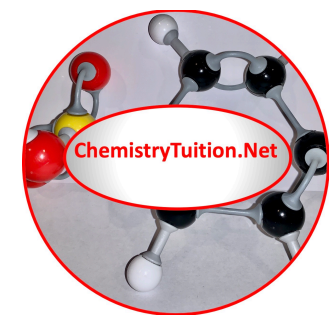
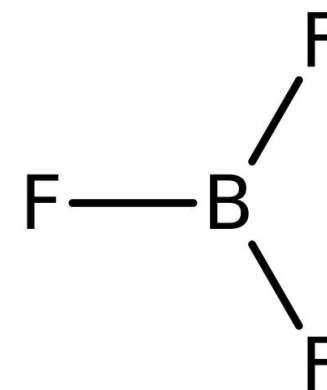


The p_z orbital is empty





BF_3 Trigonal planar





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