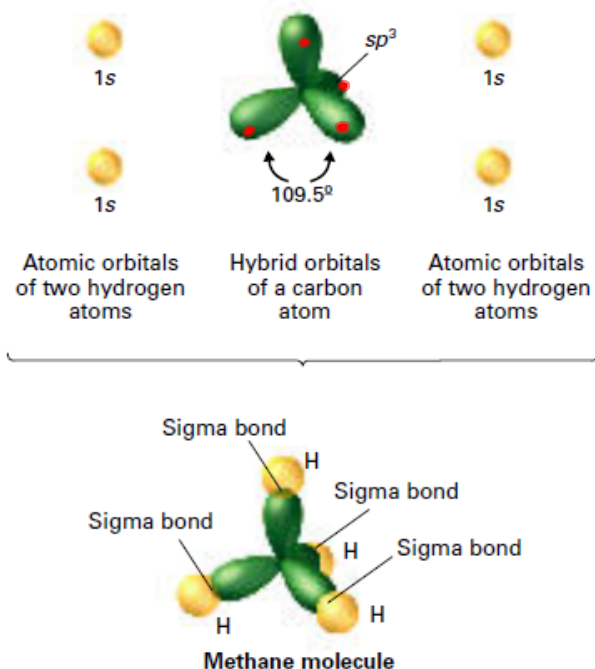


Hybridization Involving Single Bonds

In hybridization, atomic orbitals mix to form the same total number of equivalent hybrid orbitals.

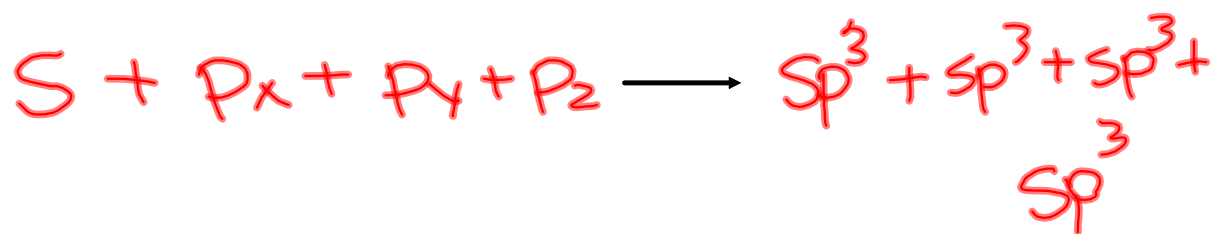
Ex. CH₄


The one 2s orbital and three 2p orbitals of a carbon atom mix to form four sp³ hybrid orbitals.

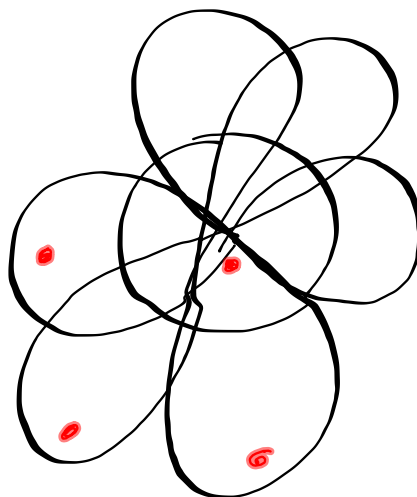
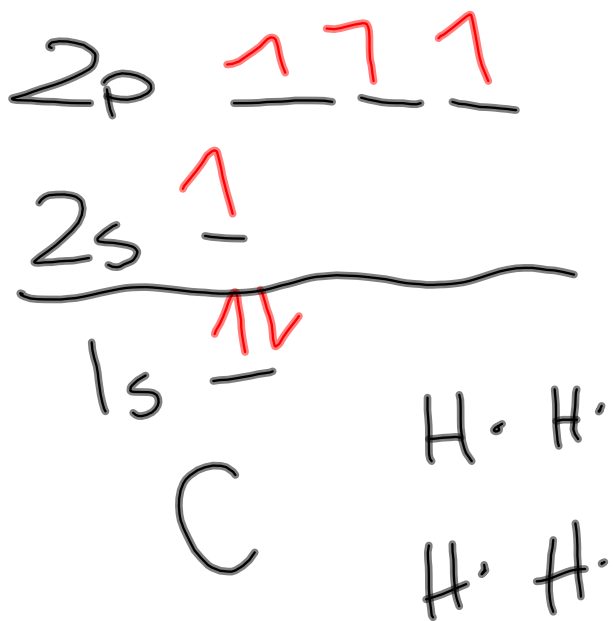


atomic orbitals

molecular orbitals

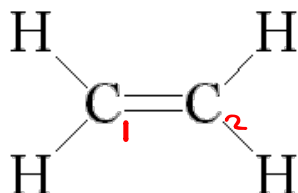



σ bonds



Hybridization Involving Double Bonds

Ex. C_2H_4



The one $2s$ orbital and two $2p$ orbitals of each carbon atom mix to form three sp^2 hybrid orbitals.

Two of the sp^2 orbitals overlap with the $1s$ hydrogen orbital to form carbon-hydrogen sigma bonds.

The third sp^2 orbital overlaps with an sp^2 orbital from the other carbon to form a carbon-carbon sigma bond.

The non-bonding $2p$ orbitals overlap side-by-side to form a carbon-carbon pi bond.

