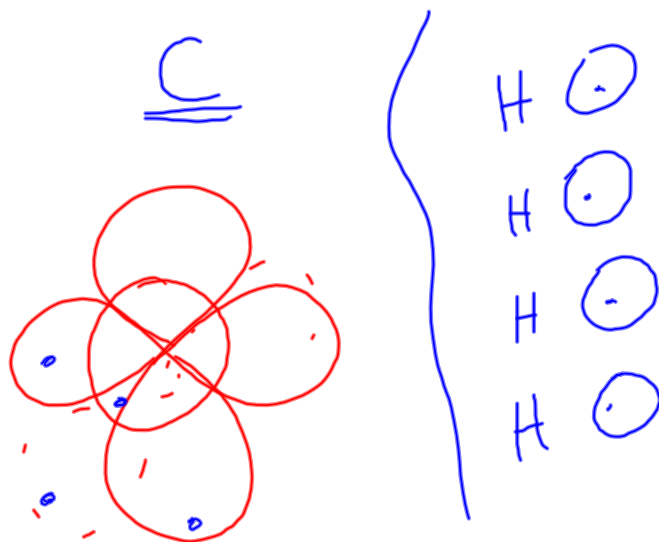
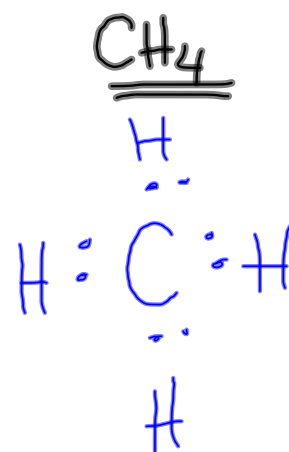
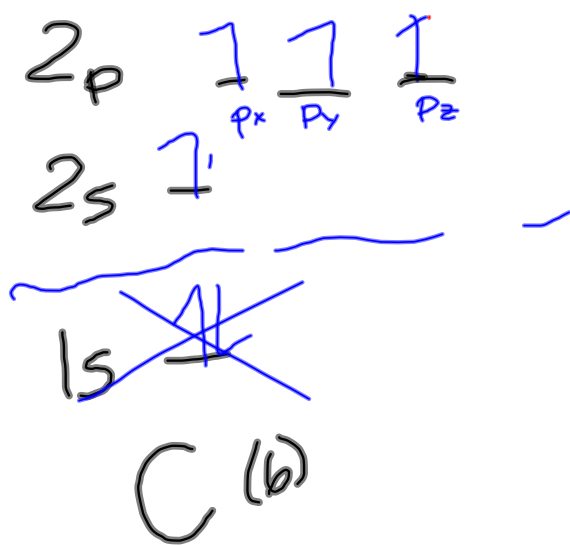


**p. 229 #23-29**  
**Worksheet**

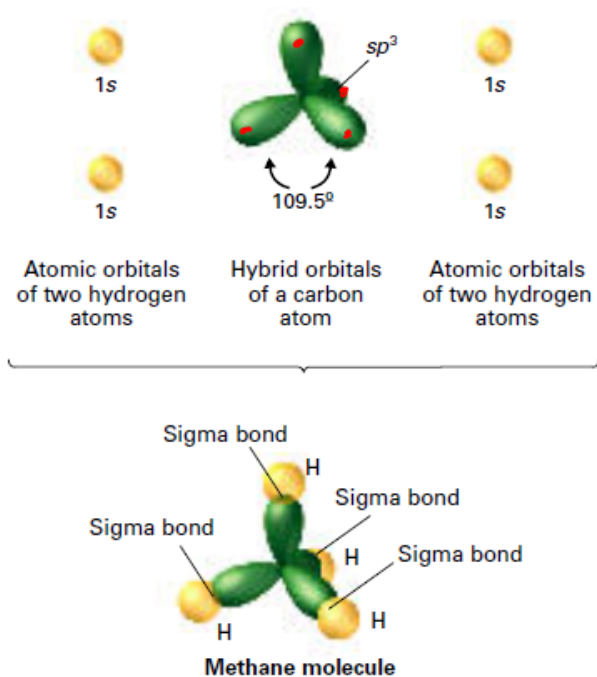


## Hybridization Involving Single Bonds

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

Ex. CH<sub>4</sub>

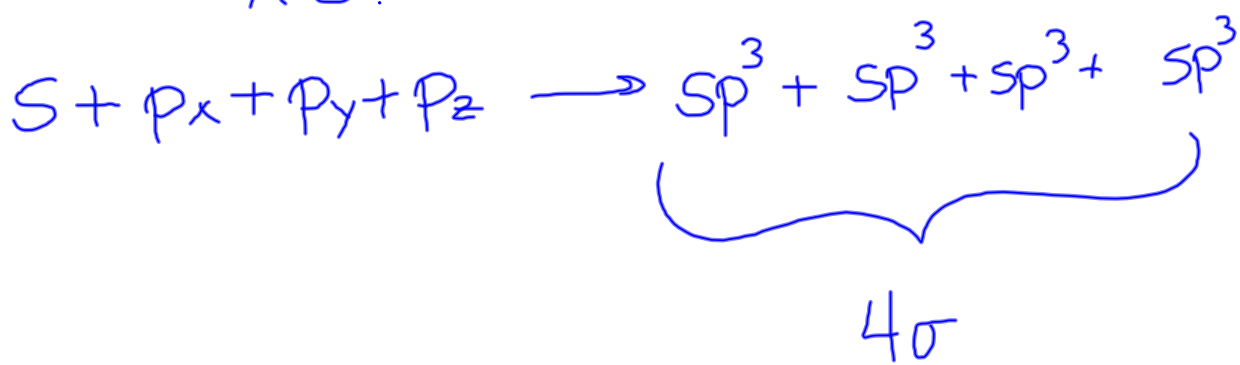
The one 2s orbital and three 2p orbitals of a carbon atom mix to form four  $sp^3$  hybrid orbitals.





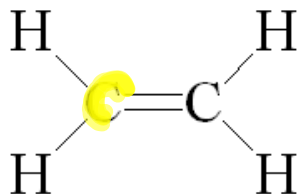
A.O.

M.O.



## Hybridization Involving Double Bonds

Ex.  $C_2H_4$

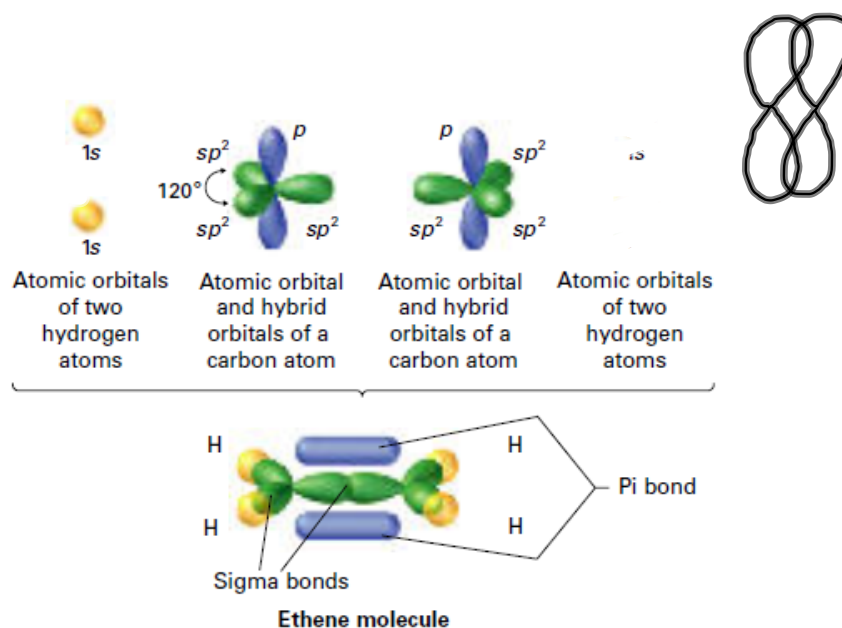


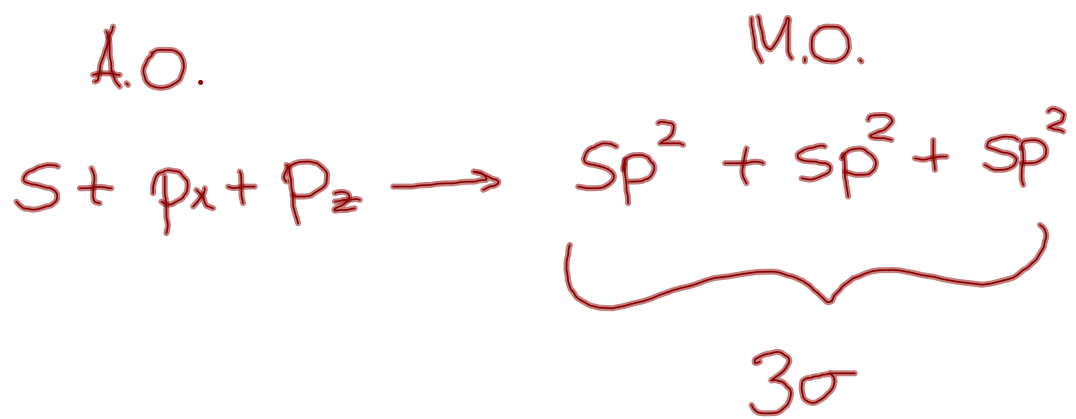
The one  $2s$  orbital and two  $2p$  orbitals of each carbon atom mix to form three  $sp^2$  hybrid orbitals.

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.





$p_y$

$p_y$   
 $\curvearrowright \pi$

## Hybridization Involving Triple Bonds

Ex.  $C_2H_2$

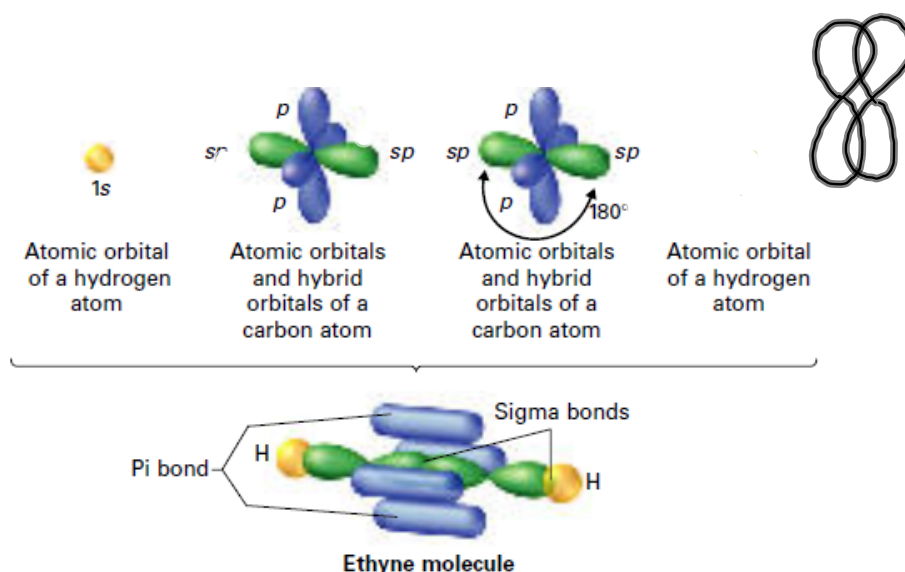


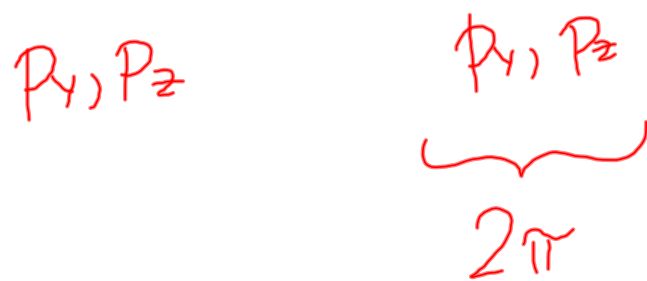
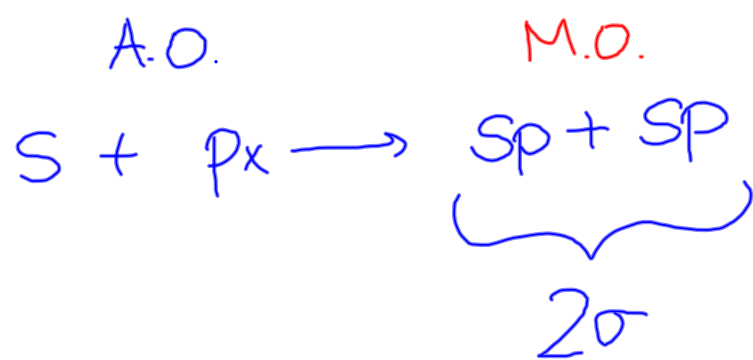
The one  $2s$  orbital and one  $2p$  orbitals of each carbon atom mix to form two  $sp$  hybrid orbitals for each carbon.

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

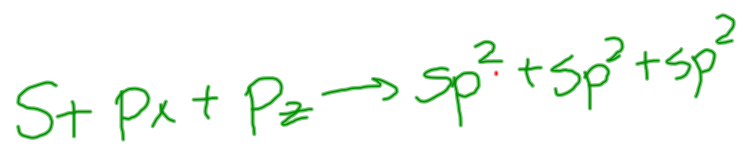
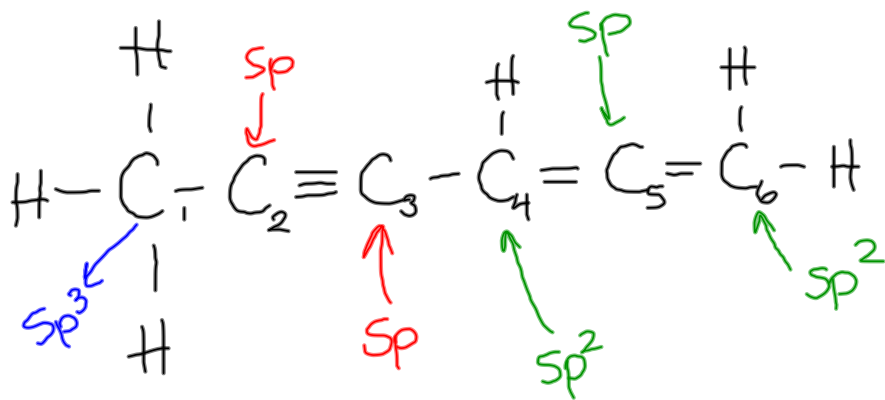
The second  $sp$  orbital overlaps with the  $sp$  orbital from the other carbon to form a carbon-carbon sigma bond.

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









# **Homework**

## **Worksheet**