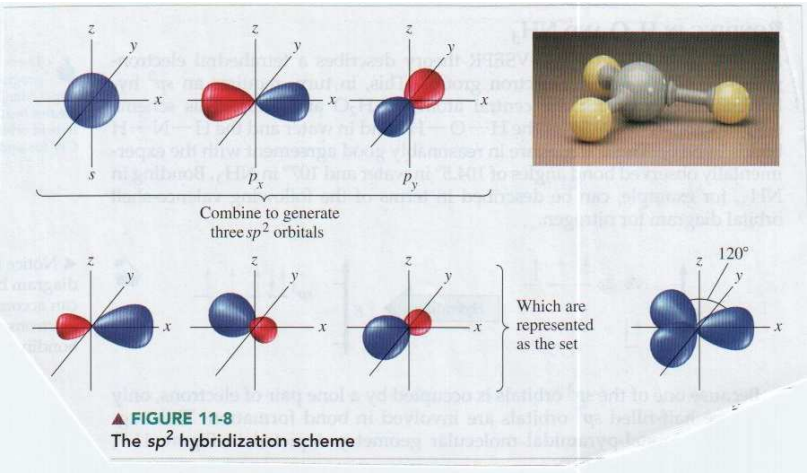
1 Morning class week 6 day 2: sp and sp^2 hybridization

1. sp^2 **hybridization** takes place at SN 3 centers. The sp^2 hybridization scheme is shown below.



2. You will learn in class how to generate the hybridized orbital diagram for formaldehyde, H_2CO. Please draw hybridized orbital diagrams for the following other SN 3 based molecules:

   (a) ethylene, C_2H_4

   (b) butadiene, $CH_2CHCHCH_2$

   (c) benzene, C_6H_6. In benzene, the C atoms form a perfectly regular hexagon of bonded atoms.

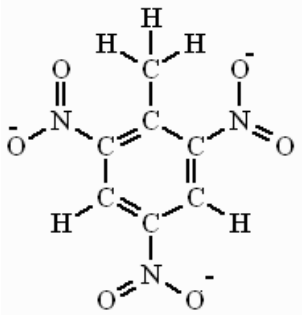
   (d) ozone, O_3

   (e) the carbonate ion, CO_3^{2-}.

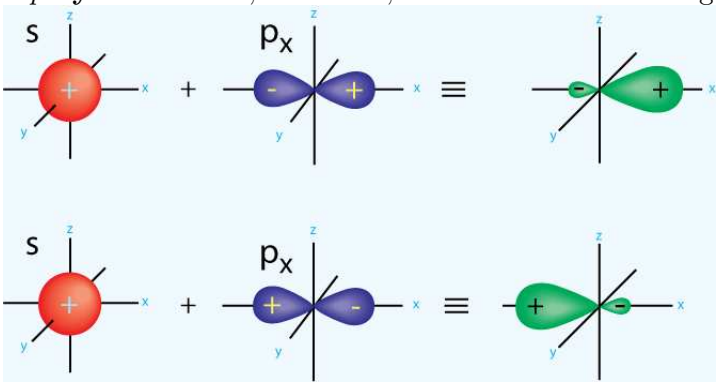
3. It is possible to combine SN 3 and SN 4 sites into a single hybridized orbital diagram. You will learn in class how to do so with acetone, CH_3COCH_3. Please draw hybridized orbital diagrams for:

   (a) formic acid, HCO_2H

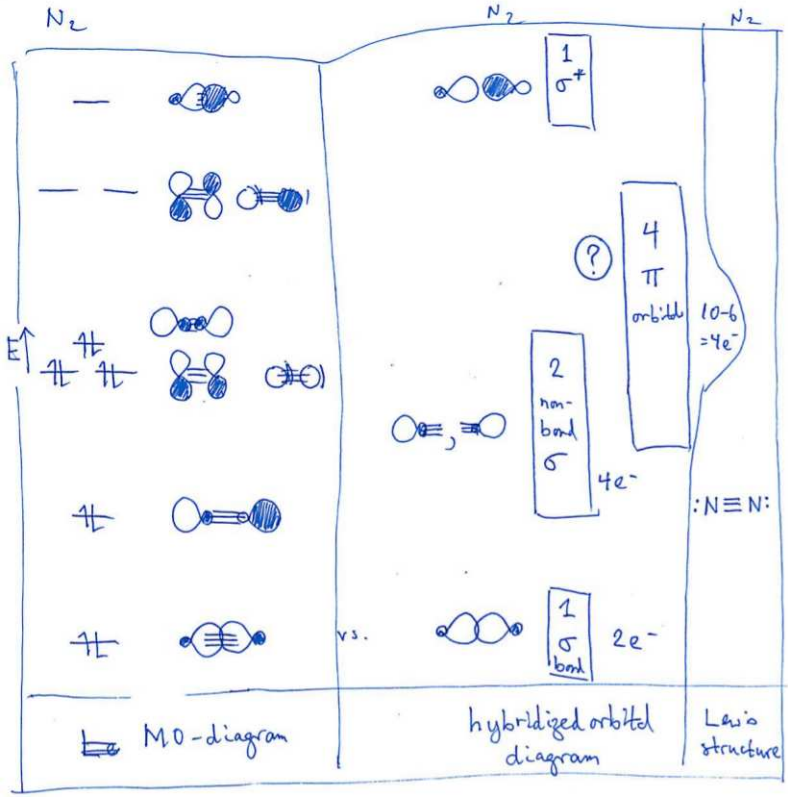
   (b) TNT, trinitrotoluene



4. Finally, there is *sp* **hybridization**, see below, which is used for SN 2 geometries.



One of the MO diagrams you have previously studied is that of N_2, shown below. We can therefore make an N_2 electron Rosetta Stone. After studying this drawing, please draw hybridized orbital diagrams for the three molecules listed below. The last of the three molecules combines *sp* and sp^3 hybridization.



(a) BeH_2

(b) CO_2

(c) CH_3CN