

Chemical Bonding and Molecular Structure

★ Formal Charge

$$\left[\begin{array}{l} \text{Formal Charge (F.C.)} \\ \text{on an atom in a} \\ \text{Lewis structure} \end{array} \right] = \left[\begin{array}{l} \text{total no. of valence} \\ \text{electrons in the} \\ \text{free atom} \end{array} \right] - \left[\begin{array}{l} \text{total no. of non bonding} \\ \text{(lone pair) electrons} \end{array} \right] - \frac{1}{2} \left[\begin{array}{l} \text{total number of} \\ \text{bonding electrons} \end{array} \right]$$

★ Dipole moment $\mu = Q \times r$ D

Q = charge, r = distance of separation

Debye ($1D = 3.33564 \times 10^{-30} \text{ C}\cdot\text{m}$)

★ Sum and difference of wave functions

$$\psi_{MO} = \psi_A \pm \psi_B$$

★ Bond order = $\frac{1}{2} (N_b - N_a)$

N_b = No. of electrons occupying bonding orbitals

N_a = No. of electrons occupying antibonding orbitals

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