

Organic Chemistry

- **Textbook :**

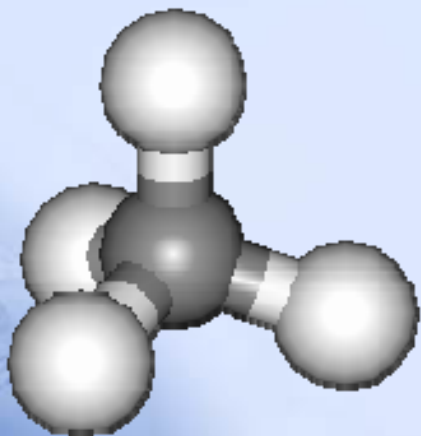
**Organic Chemistry, 6th. Edition,
T.W.Graham Solomons, John Wiley & Sons,
Inc.**

- **References:**

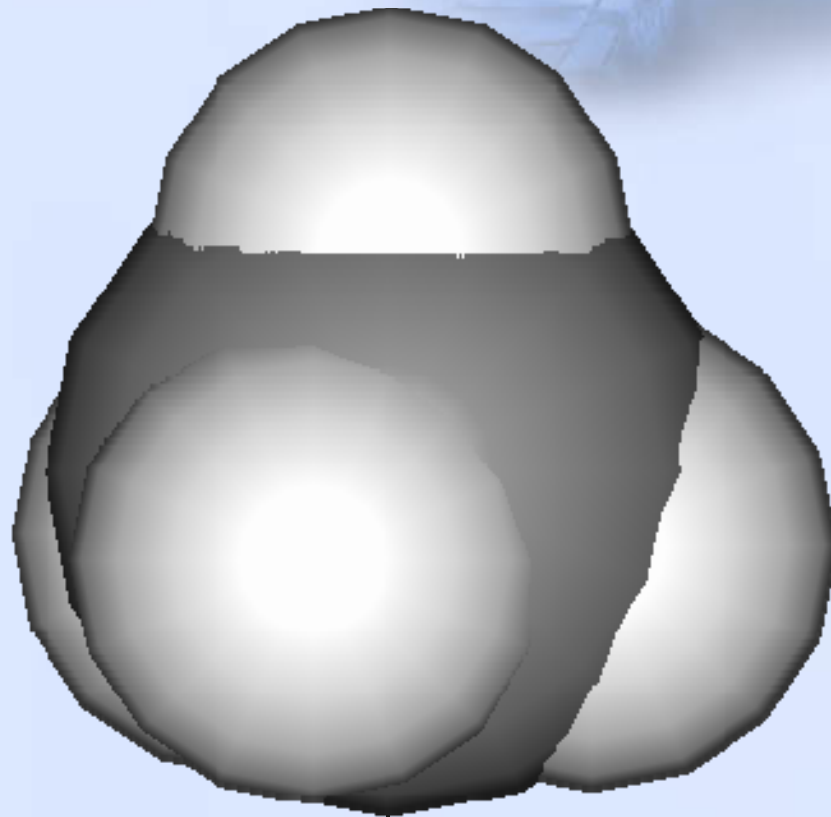
Books, Journals, and any others.

Chemical Bonding

**Methane is Tetrahedral with
Dihedral angles of 109.5°**



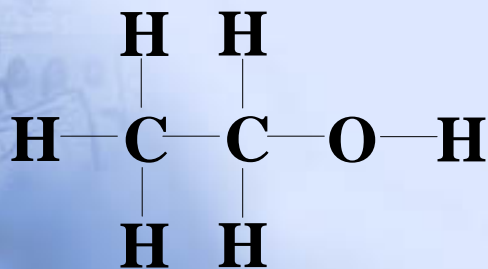
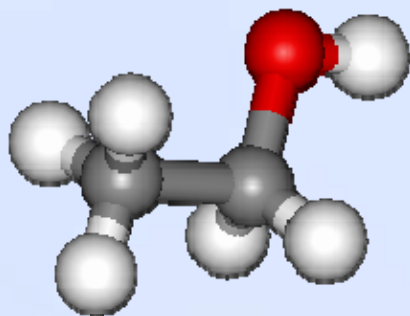
"Ball and Stick" Model



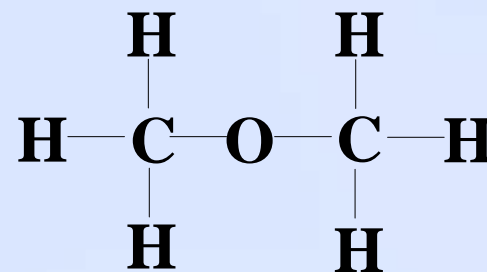
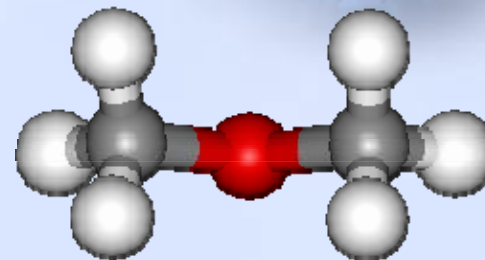
"Space Filling" Model

Chemical Bonding

Formulas and isomers



Ethyl alcohol

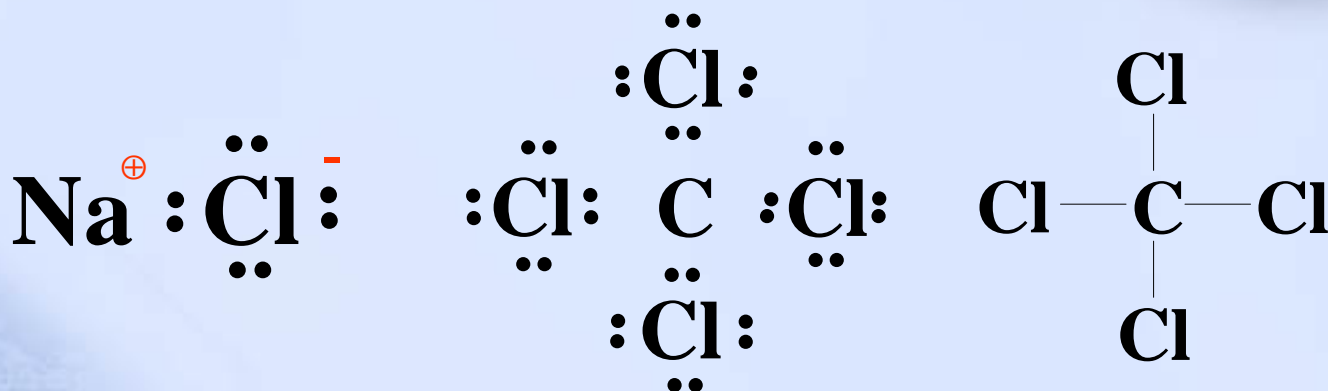


Dimethyl ether

Constitutional isomers

Chemical Bonding

Ionic and Covalent Bonding



Ionic

Covalent

For simple molecules, the two limiting cases of bonding are **Ionic**, where full electron transfer occurs, and **covalent**, where the bonding electrons are shared between the two atoms. **Covalent bonding is commonly observed in organic compounds.**

Chemical Bonding

- **Chemical Bonds: Ionic Bond (inorganic), Covalent Bond (organic)**
- **Ionization Energy, Electron Affinity**
- **Ions: Cation, Anion**
- **Endothermic (absorb), Exothermic (release)**
- **Lewis Structure: *electron-dot formulas and dash formulas***
- **Octet Rule**
- **Bond Dissociation Energy or Bond Energy**

Chemical Bonding

Electronegativity

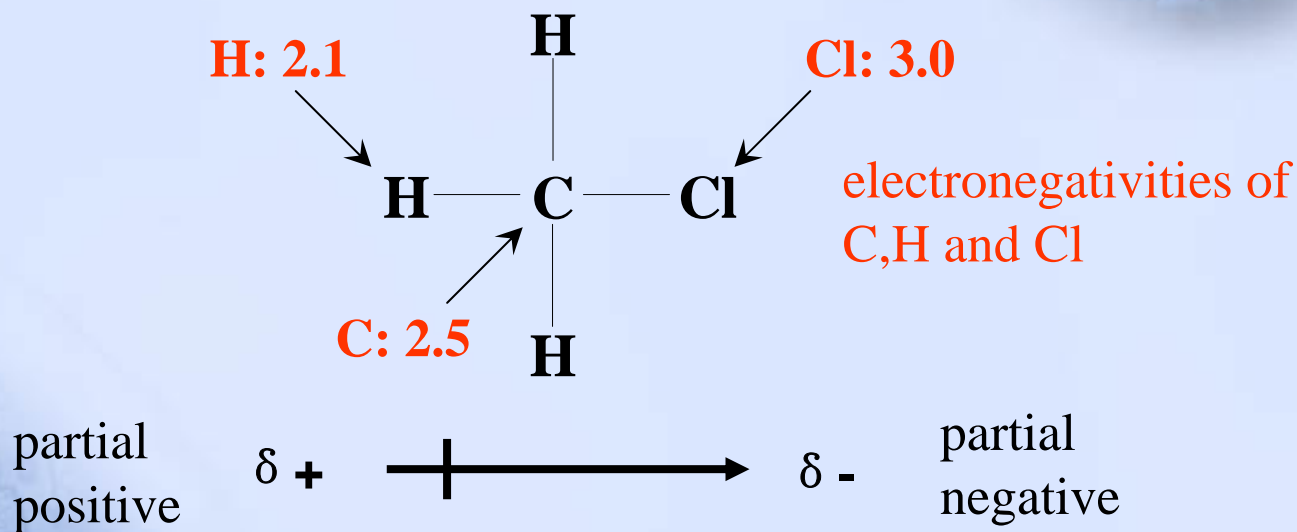
			H 2.0				
Li 1.0	Be 1.5	B 2.0	C 2.5	N 3.0	O 3.5	F 4.0	
Na 0.9	Mg 1.2	Al 1.5	Si 1.8	P 2.1	S 2.5	Cl 3.0	
K 0.8						Br 2.8	

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Chemical Bonding

Polarization of Covalent Bonds



In **chloromethane** (CH₃Cl), the polarization generated by the more electronegative chlorine creates a **dipole moment** in the molecule.

Chemical Bonding

Dipole Moment

$$\mu = e \times d$$

The charge (e) on an electron is 4.8×10^{-10} electrostatic units (esu), and the distances (d) within a molecule typically fall in the 10^{-8} cm range, so this value of 10^{-18} (esu cm) is defined as a **debye, D**.

Chemical Bonding

Formal Charge

$$F = Z - S/2 - U$$

F is the formal charge, Z is the group number, S is the number of shared electrons, and U is the number of unshared electrons.

Chemical Bonding

Resonance

Carbonate ion CO_3^{2-}

