Organic Chemistry - The Chemistry of Carbon Compounds

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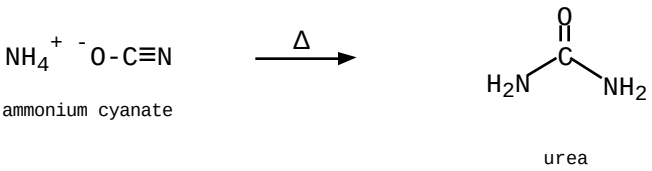
The Origin of Modern Organic Chemistry

Vital Force Theory - life (the vital force) is needed to prepare organic compounds.

Wohler (1828) prepared urea, an organic compound $(NH_2)_2CO$, in the laboratory, thus disproving the vital force theory.

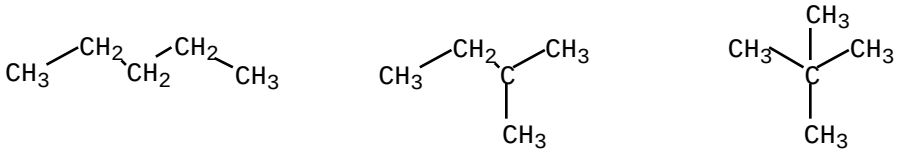


ammonium cyanate

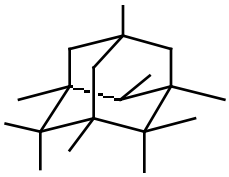
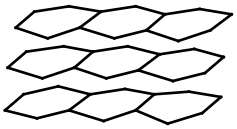
urea

Catentation - the formation of networks (often "chains") of identical atoms bonded together. Carbon is unique in its ability to cantentate in its compounds). In its most stable state, carbon has four bonds.

isomer of pentane, C_5H_{12}



Pure carbon has several allotropic forms:

Diamond	Graphite	C_{60}, buckminsterfullerene
		

Organic chemistry provides the foundation for the study of biochemistry, the chemistry of living systems.

List the four major differences between ionic and covalent compounds.

1. Ionic bonds result from transfer of electrons, whereas covalent bonds are formed by sharing.
2. Ionic bonds are electrostatic in nature, resulting from that attraction of positive and negative ions that result from the electron transfer process; charge separation between covalently bonded atoms is less extreme.
3. Ions are arranged in a three-dimensional array, or crystals. Covalently bonded substances exist as discrete molecular units.
4. Ionic compounds often dissociate into ions in solution, whereas covalently bonded molecules retain their molecular identity in solution.

Comparison of properties between ionic (inorganic) and covalent (organic) compounds.

Property	Inorganic	Organic
melting point	High	Low
boiling point	High	Low
solubility in H_2O	generally soluble	generally insoluble
flammability	nonflammable	flammable
rate of chemical reactivity	often fast	often fast
ability to conduct in solution	conductors in solution	nonconductors in solution