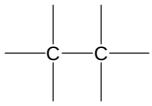
02: Introduction to Organic Chemistry

Organic Chemistry

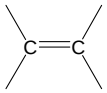
- Chemistry of Carbon
- Terminology
- Proper Structures

Functional Groups

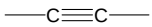
- **Alkane:** Contains a carbon-carbon single bond.



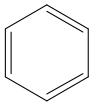
- **Alkene:** Contains a carbon-carbon double bond.



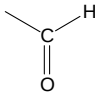
- **Alkyne:** Contains a carbon-carbon triple bond.



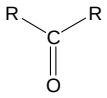
- **Aromatic:** Contains a six-membered ring, with alternating double and single bonds.



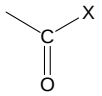
- **Alkyl Halide:** Contains an alkyl (alkane – R) and a halogen, RX.
- **Alcohol**: Contains a ROH.
- **Ether**: Contains a ROR.
- **Thiol**: Contains RSH.
- **Sulfide**: Contains a RSR.
- **Aldehyde**: Contains a H bonded to a C on one side of a C=O and a R or H bonded to a C on the other side.



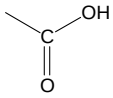
- **Ketone**: Contains 2 R groups attached to the C on either side of a C=O.



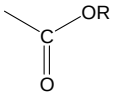
- **Acid Halide:** Contains a C=O, with an X attached to the C on one side and an R or H attached to the C on the other side.



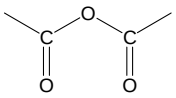
- **Carboxylic Acid**: Contains a COOH, with an R or H attached to the C of the COOH.



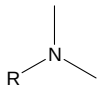
- **Ester**: Contains a COO, with an R attached to the O and a H or R attached to the C.



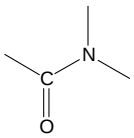
- **Anhydride**: Contains an OCOCO, with an R or H attached on either side of the O.



- **Amine:** Contains an N, with R and / or H attached to the N.



- **Amide**: Contains a N attached to the C of a C=O, with H or R on the other positions.



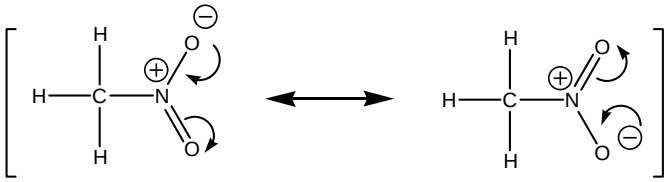
- **Nitrile**: Contains a carbon nitrogen triple bond.

Acids and Bases

- **Arrhenius Acid**: Dissociates to give H_3O^+.
- **Arrhenius Base:** Dissociates to give ^-OH.
- **Bronsted-Lowry Acid:** Donates an H^+.
- **Bronsted-Lowry Base:** Accepts an H^+.
- **Conjugate Acid:** acid that results from the Bronsted-Lowry base gaining an H^+.
- **Conjugate Base**: the base that results from the Bronsted-Lowry acid losing an H^+.
- **Amphoteric**: Can react as an acid or a base.
- **Lewis Acid**: Accepts electron pairs to form new bonds.
- **Lewis Base**: Donates electron pairs to form new bonds.

Electron Pushing

- Locate the electrons on the more electronegative atoms.
- Identify the most electronegative atom and the least electronegative atom in a bond.
- A mechanism is a step-by-step explanation of what happens in a chemical reaction.
- The flow of electrons in a mechanism is from the most electronegative atom to the least electronegative atom.
- The nucleophile donates the electrons in a mechanism.
- The electrophile accepts the electrons in a mechanism.
- Resonance structures are two or more equivalent structures for the same arrangements of atoms, the only difference is the location of the electrons.
- Delocalization is the distribution of electrons among more than two atoms that are bonded together.



How to Study Organic Chemistry

- For the terminology, know the definition of such terms as nucleophile, electrophile, syn, anti, etc.
- Learn the functional groups and be able to recognize them quickly.
- Learn the first ten alkanes, along with the prefixes and suffixes.
- Identify the most electronegative and the least electronegative atoms.
- The flow of electrons is from negative to positive.
- Understand the concepts, do not just memorize examples.
- Find examples in the textbook or on websites to reinforce the concepts.
- Make flashcards.
- Ask for help if you don't understand something.

How to Use This Cheat Sheet: These are the keys related this topic. Try to read through it carefully twice then write it out on a blank sheet of paper. Review it again before the exams.

