HONORS CHEMISTRY UNIT 18 NOTEPACKET

ORGANIC CHEMISTRY

CARBON BONDING

ALKANES

Hydrocarbons

* Saturated
* Unsaturated

Alkanes: CnH2n +2

Methane

Ethane

Propane

Butane

Pentane

Hexane

Heptane

Octane

Nonane

Decane

Normal, straight chain, or unbranched hydrocarbons

STRUCTURAL FORMULAS AND ISOMERISM

Structural isomerism

Example: Butane and Isobutane

Isomers of Pentane

NAMING ALKANES

Substituent groups

RULES FOR NAMING ALKANES

1. Find the longest continuous chain of carbon atoms. This chain is called the parent chain and determines the base alkane name
2. Number the carbons in the parent chain, starting at the end closest to any branching. When a substituent occurs the same number of carbons from each end, use the next substituent to determine from which end to start numbering.
3. Using the appropriate name for each alkyl group, specify its position on the parent chain with a number.
4. When a given type of alkyl group occurs more than once, attach the appropriate prefix (di-, tri, tetra, etc) to the alkyl name
5. The alkyl groups are listed in alphabetical order, disregarding any prefix.

EXAMPLE: Draw and Name the structural isomers for C6H14

Name the following molecules

Writing Structural Isomers from Names

1. 4-ethyl-3,5 dimethylnonane
2. 4-*tert*-butylheptane

PETROLEUM

Petroleum

Natural Gas

Fractions

REACTIONS OF ALKANES

Combustion reactions

Substitution reactions

Dehydrogenation reactions

ALKENES AND ALKYNES

Alkenes

Alkynes

RULES FOR NAMING ALKENES AND ALKYNES

1. Select the longest continuous chain of carbon atoms that contains the double or triple bond
2. For an alkene, the root name of the carbon chain is the same as for the alkane, except that the –ane ending is replaced by –ene. For an alkyne, the –ane is replaced by –yne.

Examples:

1. Number the parent chain, starting at the end closest to the double or triple bond. The location of the multiple bond is given by the lowest-numbered carbon involved in the bond.

Example:

1. Substituents on the parent chain are treated the same way as in naming alkanes.

Example:

Sample problems

Reactions of Alkenes

Addition Reaction

Hydrogenation reaction

Halogenation

Polymerization

AROMATIC HYDROCARBONS

NAMING AROMATIC COMPOUNDS

Monosubstituted benzenes

Disubstituted benzenes

Examples

FUNCTIONAL GROUPS

Halohydrocarbons

Alcohols

Ethers

Aldehydes

Ketones

Carboxylic acids

Esters

Amines

ALCOHOLS

RULES FOR NAMING ALCOHOLS

1. Select the longest chain of carbon atoms containing the –OH group
2. Number the chain such that the carbon with the –OH group gets the lowest possible number
3. Obtain the root name from the name of the parent hydrocarbon chain by replacing the final –e with –ol
4. Name any other substituents as usual

Examples

PROPERTIES AND USES OF ALCOHOLS

ALDEHYDES AND KETONES

NAMING ALDEHYDES AND KETONES

Examples

CARBOXYLIC ACIDS AND ESTERS

POLYMERS