

1. Write a definition for “organic compound”. What are some exceptions to this definition?

- a compound that contains carbon

exceptions

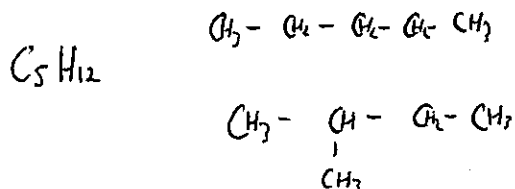
- ionic compounds with carbon ex. NaCN
 - oxides of carbon ex. CO₂
 - inorganic acids ex. H₂CO₃
2. What is the difference between a saturated organic compound and an unsaturated organic compound?

saturated - no double/triple bonds

unsaturated - double/triple bonds

3. What is a structural isomer? Give an example.

- compounds with same molecular formula but different structural formula.



4. What affects the boiling point/melting point of an organic compound?

- bp/mp is related to the amount of intermolecular (IM) forces in the compound.

ex. CH₄ only has L.D.

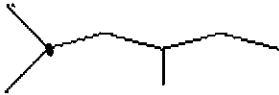
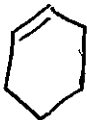
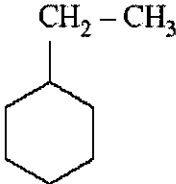
CH₂Cl₂ has L.D + D.D

CH₂Cl₂ has a higher MP + BP b/c it has more IM forces

5. In Chemistry 30 we learned to name and draw 8 different families of organic compounds. Fill in the chart below about these 8 families. The first one is done for you.

Family	Distinguishable feature	Naming Rules
Alkane	- only single bonds - only C and H atoms in compound	- branches numbered so they get lowest numbers possible - name ends in -ane
Alkene	- double bonds - only C and H	- double bond gets lowest # - name ends in -ene
Alkyne	- triple bonds	- triple bond gets lowest # - name ends in -yne
Aromatic	- contains benzene ring	
Organic Halide	- contains halogen atom(s)	
Alcohol	- hydroxyl (OH) group	
Carboxylic Acid	- ends in COOH carboxyl group	
Ester	$\begin{array}{c} \text{O} \\ \parallel \\ -\text{C} - \text{O} - \text{C} - \end{array}$	

6. Fill in the chart below.

Compound Name	Compound Structure	Organic Family
4-methylpent-1-yne	$\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{C} \equiv \text{CH} \\ \\ \text{CH}_3 \end{array}$	alkyne
3,6,6-trimethylheptane 2,2,5	$\begin{array}{ccccccc} & & \text{CH}_3 & & & \text{CH}_3 & \\ & & & & & & \\ \text{CH}_3 - & \text{CH}_2 - & \text{CH} - & \text{CH}_2 - & \text{CH}_2 - & \text{C} - & \text{CH}_3 \\ & & & & & & \\ & & & & & \text{CH}_3 & \end{array}$	alkane
2,4-dimethylhexane		alkane
Cyclohexene		alkene
ethylcyclohexane		alkane
propanoic acid	$\begin{array}{ccccc} & \text{H} & \text{H} & & \text{O} \\ & & & & // \\ \text{H} - & \text{C} - & \text{C} - & \text{C} & \\ & & & \backslash & \\ & \text{H} & \text{H} & & \text{O} - \text{H} \end{array}$	carboxylic acid
hex-3-yne	$\text{CH}_3 - \text{CH}_2 - \text{C} \equiv \text{C} - \text{CH}_2 - \text{CH}_3$	alkyne
methyl propanoate	$\begin{array}{ccccccc} & \text{H} & \text{H} & \text{O} & & \text{H} & \\ & & & & & & \\ \text{H} - & \text{C} - & \text{C} - & \text{C} - & \text{O} - & \text{C} - & \text{H} \\ & & & & & & \\ & \text{H} & \text{H} & & & \text{H} & \end{array}$	ester
methylpropan-2-ol	$\begin{array}{c} \text{OH} \\ \\ \text{CH}_3 - \text{C} - \text{CH}_3 \\ \\ \text{CH}_3 \end{array}$	alcohol

7. We learned 6 different reactions that organic compounds can undergo. For each one, read the page numbers listed and write what the reactants can be and what is produced in the type of reaction

a. Addition reactions (pg 419-420)

Reactants are: alkenes/alkynes and small diatomic element or H_2O

Product(s) are: ~~same~~ alkane or alcohol (if H_2O added)

b. Substitution reactions (pgs 421-422)

Reactants are: alkanes or aromatic and diatomic halogen

Product(s) are: organic halide

c. Elimination reactions (pgs 431-432)

Reactants are: alkanes or alcohols

Product(s) are: alkenes and ~~diatomic element~~ ^{H_2} or H_2O

d. Esterification reactions (pgs 438-440)

Reactants are: carboxylic acid + alcohol

Product(s) are: ester and water

e. Complete Combustion (pgs 398-400)

Reactants are: hydrocarbon + O_2 (excess)

Product(s) are: $CO_2(g)$ $H_2O(g)$

f. Incomplete Combustion (pgs 398-400)

Reactants are: hydrocarbon + O_2 (limiting)

Product(s) are: $C(s)$ + $CO(g)$ + $CO_2(g)$ + $H_2O(g)$

8. What causes the difference between incomplete and complete combustion reactions?

amount of O_2 available

9. Define "polymerization"

adding monomers together to make a polymer

- addition polymerization

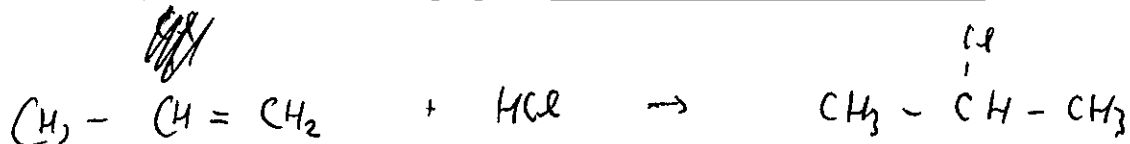
- condensation polymerization

10. For the following reactants, complete the reaction and name and/or draw the reactants and products. Name the reaction type.

a. Ethane is converted to ethene. elimination



b. 2-chloropropane is made from propene. addition



c. Butan-1-ol is made from but-1-ene. addition



d. Methyl propanoate is made. esterification



11. What is crude oil?

see
video
on
website

12. In 3 or 4 sentences, briefly describe how fractional distillation works.

13. Why do alcohols have higher boiling and melting points than alkanes of the same size (same # of carbon atoms)?

hydrogen bonding + dipole dipole present in alcohols

14. Why do larger alkanes have higher boiling/melting points than smaller alkanes?

more LD forces in larger hydrocarbons