5/23/19

O.S. decreased, e^- gained → reduction

$$4\,S_2O_3^{-2} + O_2 + H^+ \longrightarrow 2\,S_4O_6^{-2} + 2\,H_2O$$

(+2 −2 ; 0 ; +1 ; +2½ −2 ; +1 −2)

O.S. increases, e^- lost → oxidized

$2 \times S + 3 \times O = -2$

$2 \times S + 3 \times -2 = -2$

$2 \times S - 6 = -2$

$2 \times S = +4$

$S = +2$

$4 \times S + 6 \times O = -2$

$4 \times S + 6 \times -2 = -2$

$4 \times S - 12 = -2$

$4S = 10$

$S = 2\,1/2$

The S in $S_2O_3^{-2}$ had its oxidation state increased, so $S_2O_3^{-2}$ was oxidized. This means that $S_2O_3^{-2}$ was the reducing agent.

The O in O_2 had its oxidation state decreased, so O_2 was reduced. This means that O_2 was the oxidizing agent.

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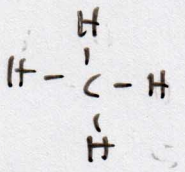
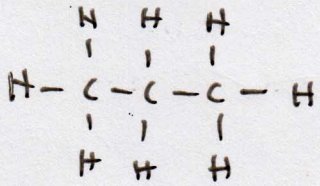
organic – related to compounds that contain carbon

Carbon almost always reacts to have a total of 4 bonds (tetravalent).

hydrocarbon – a substance that only contains carbon and hydrogen

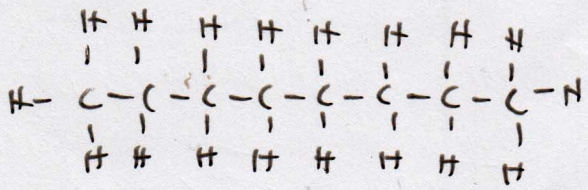


methane



propane

alkanes – hydrocarbons that only contain single bonds



octane

line structures – simplified Lems dot structures used for representing organic compounds,

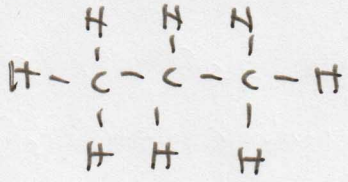
rules for writing line structures

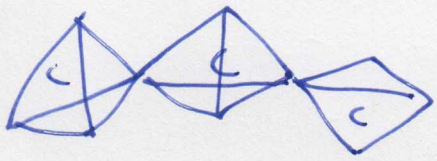
- Normally, the atomic labels for carbons are left out
- Normally, the atomic labels for hydrogens attached to carbon and the bond lines to those hydrogens are left out,

rules for reading line structures

- Any point on a structure that is missing an atomic label is automatically assumed to be carbon.
- If a carbon has less than four bonds shown, it is automatically assumed there are hydrogens attached to bring the total number of bonds up to four.

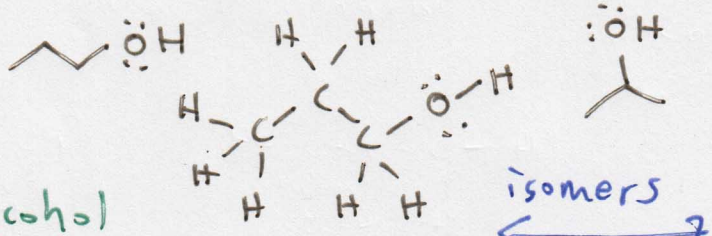
propane





The "zig-zag" shape that many organic molecules have when written is due to the fact that carbon with four single bonds has a tetrahedral shape.

isomers – molecules with the same chemical formula but different structures

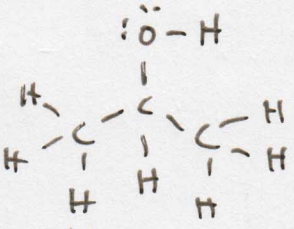


propyl alcohol

C_3H_8O

$CH_3CH_2CH_2OH$

isomers

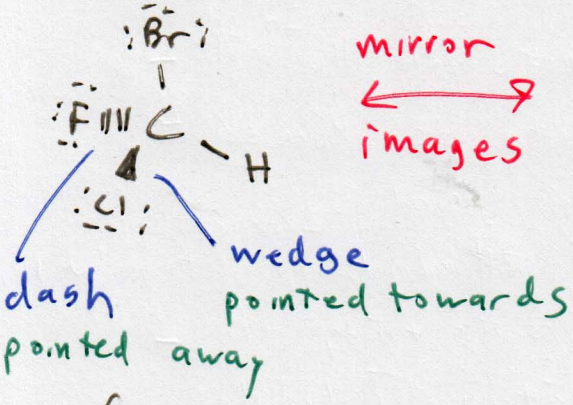


isopropyl alcohol

C_3H_8O

$CH_3CHOHCH_3$

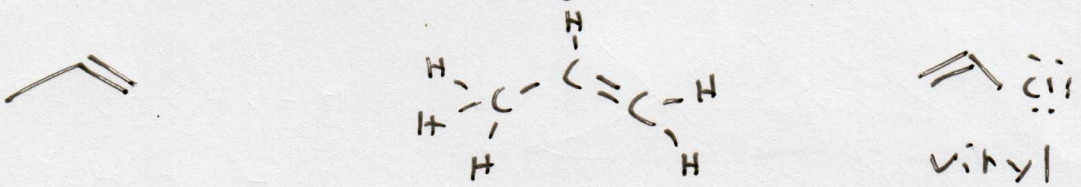
haloalkanes – alkanes that contain halogens (Br, Cl, F, I)

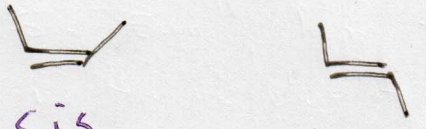


Stereoisomers – isomers that have the same bond connectivity but different three-dimensional arrangements

functional group – a group of atoms that has the same reactivity regardless of the molecule it's found on.

alkene – a hydrocarbon that contains a carbon-carbon double bond





Alkenes have a form of isomer that is created due to the fact that the geometry around a carbon-carbon double bond is locked into place.

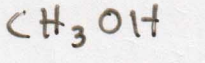
saturated – an organic compound that only has single bonds

unsaturated – an organic compound that contains double or triple bonds.

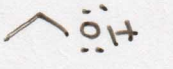
alkyne – a hydrocarbon that contains a carbon-carbon triple bond.

acetylene $H-C\equiv C-H$

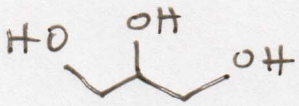
alcohol – an organic compound that contains an –OH group. When oxygen connects to carbon, it forms a covalent bond, not an ionic bond. Alcohols are therefore <u>not</u> ionic compounds.



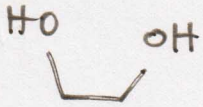
methanol
wood alcohol



ethanol
grain alcohol



glycerol



ethylene glycol
antifreeze

	# of carbons
methane	1
ethane	2
propane	3
butane	4
pentane	5
hexane	6
heptane	7

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ether – an organic compound with a C–O–C group

diethyl ether

substituent – a group of atoms substituted onto a larger molecular structure

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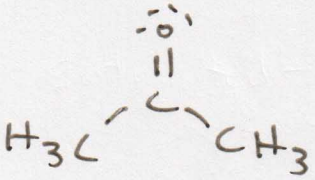
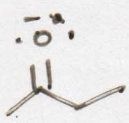
ketone – an organic compound with a C=O bond



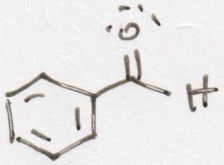
acetone



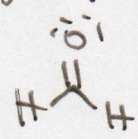
methyl ethyl ketone
(MEK)

← Both of these substances are heavily used solvents.

aldehyde – an organic compound with  group



benzaldehyde



formaldehyde