Course 343 Lecturer Hackenberger

Day Mon. Date 9/16/13

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Last time: - Conformation analysis of alkanes
- staggered, gauche, and eclipsed conformations (energy values)
- local and global energy minima + maxima
- nomenclature

Branched alkyl substituents → know the names

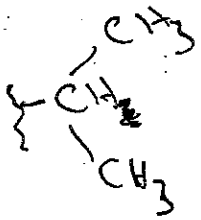
attached somewhere

C1 methyl substituent CH_3-

C2 ethyl- substituent CH_3CH_2-

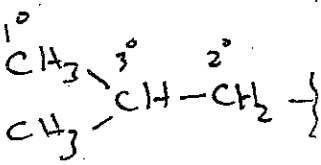
C_3 linear $-CH_2CH_2CH_3$ (n-)propyl

branched

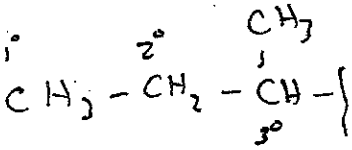


isopropyl (iPr)

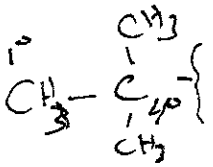
C_4 linear $CH_3-CH_2-CH_2-CH_2-$ (n-)butyl



iso butyl (iBu)



sec butyl (sBu)



tert butyl (tBu)

Differently substituted carbons → 1°, 2°, 3°, 4° carbons

attached to 1 other C; 2 C's; 3 C's; 4 C's

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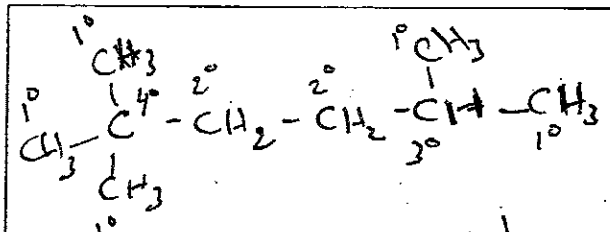
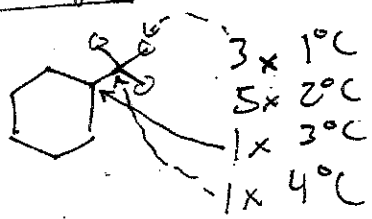


2,2,5-Trimethylhexane

Different substituted sp^3 hybridized C can be formed, differ by # of C's attached

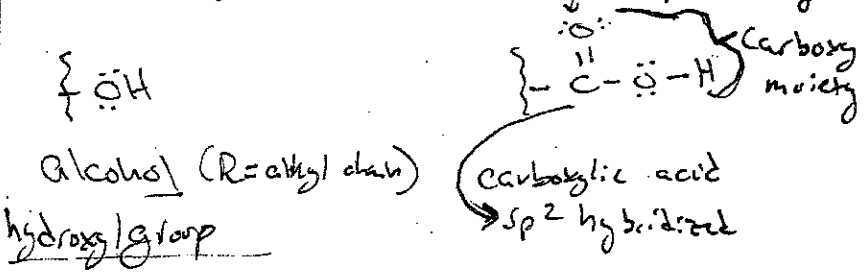
- Primary / Secondary / tertiary / Quaternary
  - 1 other carbon attached → 1°
  - 2 " → 2°
  - 3 " → 3°
  - 4 " → 4°

other example



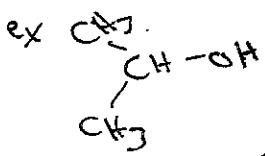
Functional Groups - remember names for nomenclature

commonly bonded atoms that have similar chemical properties

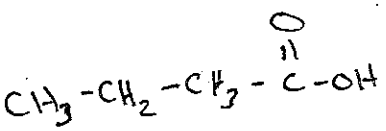


Alcohol (R=alkyl chain)

hydroxyl group

ex 

2-propanol (or isopropanol)



n-butanoic acid

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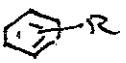
Oxidation/Reduction

oxidation: ↑O that are bound to carbon

reduction: ↑H " "



Petrolium oxidation (alkanes, aromatics)

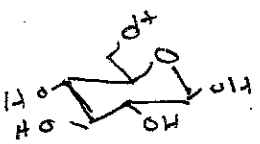
Petrolium $\xrightarrow{\Delta O_2}$ $CO_2 + H_2O + \Delta E$ · CH_4 → fully reduced

↳ fully oxidized C

Reduction: plants $CO_2 \xrightarrow{h\nu}$ Carbohydrates (photosynthesis)

↓

glucose



animals: Glucose $\xrightarrow{O_2}$ CO_2 + Energy (respiration) → oxidative process

Carbohydrates

↳ stored as fat or ATP

CH. 3 - Acids + Bases

Problems (3.X) X = 1-10, 15, 21, 24, 27, 39, 42a-c, 43, 45, 49, 50

A/B reactions: $H^{\oplus}$ transfer (proton)

$$A\text{-}H + :B \rightleftharpoons A:^{\ominus} + H\text{-}B^{\oplus}$$

A-H	:B	$A:^{\ominus}$	$H\text{-}B^{\oplus}$
(acid)	(base)	Conjugate base	Conjugate Acid
e^- deficient (acceptor)	e^- rich (donor)		

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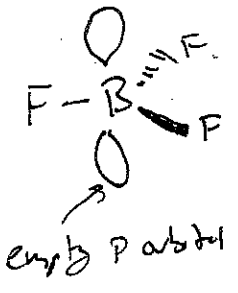
Three definitions:

~~Arrhenius~~ Arrhanius: A forms $H^{\oplus}$ } happens in an aqueous system
B forms $OH^{\ominus}$ }

Bronsted-Lowery: A proton donor
B proton acceptor

Lewis: A - e^- deficient system (e^- acceptor)
B - e^- rich system (e^- donor)

example: Boron trifluoride



B - 6 valence electrons (wants 8) → can accept 2 more in the empty p orbital

Lewis acid

$BF_3 + F^{\ominus} \rightleftharpoons BF_4^{\ominus}$

Lewis acid Lewis base

Use of arrows to indicate e^- movement
- start @ the e^- donor (or e^- in the bond)
- end @ the e^- acceptor