

Chapter 4: Alkanes

- Nomenclature/Constitutional isomers
- Conformations of alkyl chain structures
- Conformations of cyclic structures (namely cyclohexanes)

Alkanes

aka. paraffins Latin: little affinity

1. all carbons are sp^3 hybridized
2. very unreactive
 - i. used as fuels
 - ii. cracked and reformed
 - iii. halogenated (later...chapter 10)

3. two types

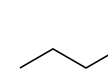
i. acyclic

ii. cyclic (an unsaturation—missing 2H for each ring)

Alkanes

know $C_1 \rightarrow C_{10}$ see table 4.1

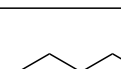
#C's (n)	Formula	Name	Isomers
1	CH ₄	methane	1
2	C ₂ H ₆	ethane	1
3	C ₃ H ₈	propane	1
4	C ₄ H ₁₀	butane	2
5	C ₅ H ₁₂	pentane	3
6	C ₆ H ₁₄	hexane	5
7	C ₇ H ₁₆	heptane	9
8	C ₈ H ₁₈	octane	18
9	C ₉ H ₂₀	nonane	35
10	C ₁₀ H ₂₂	decane	75



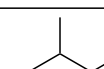
butane



isobutane



pentane

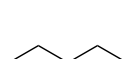


isopentane

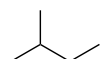
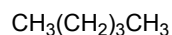


neopentane

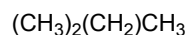
Representing Structures



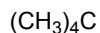
n-pentane



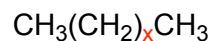
isopentane



neopentane



Normal Alkanes



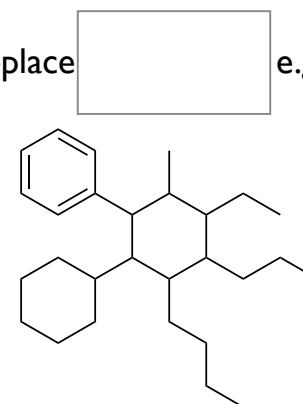
Naming (organic) Molecules-IUPAC

Requires naming parts (groups) hanging off the main molecule
Extremely Systematic!

For groups, replace

e.g.

methyl
ethyl
propyl
butyl
cyclohexyl
phenyl



see 6 special groups handout