Introduction to Alkane Nomenclature

A. Determining the Priority of Functional Groups

To zig a subject to cover on one sheet! This paper will focus on alkanes. Determining functional group priority will be the subject of a subsequent sheet.

B. Applying the Chain Length Rule

1. 3-ethyl-5-(1-methylpropyl)-4,4-dimethylnonane

The purpose of this sheet is to demonstrate the rules by which alkanes are named.

ORDER OF BUSINESS

A. Determine the priority of functional groups (not covered here since we’re dealing with alkanes only)
B. Find the longest linear chain of your molecule, or the largest ring (whichever is greatest). This is the chain length rule which defines both the main chain and also the suffix.

C. Identify the substituents along your main chain. Substituents are classified according to length of carbon chain and the suffix “-y” is attached.
D. Number your chain from one of the ends. The LOWEST LOCATOR RULE determines which end is chosen as carbon #1. *Number the chain such as to provide the lowest possible locators for the chain.*

E. Multiple instances of substituents are given the prefixes di, tri, tetra, etc.

F. Branched substituents are numbered and named separately from the main chain, and put in brackets.

G. The FINAL name is assembled such as to arrange the substituents in alphabetical order.

- Prefixes like “-y”, “-tart”, “-7”, and “-sec” are ignored for alphabetization purposes.

- The EXCEPTION is “isopropyl” and “isobutyl”. For some reason these count as “-1” - not covered here, but this is also where one puts in descriptors like “cyclo”, “tria”, (R), (S) (E), (Z), and so on.

Names for Hydrocarbon Chains and Rings

1. methane
2. ethane
3. propane
4. butane
5. pentane
6. hexane
7. heptane
8. octane
9. nonane
10. decane
11. undecane
12. dodecane
20. eicosane

Sometimes you will see “-y” in front to indicate that it is a straight-chain alkane

3. cyclopropane
4. cyclobutane
5. cyclopentane
6. cyclohexane
7. cycloheptane
8. cyclooctane
9. cycnona-7 and higher follow the same pattern.
10. undecane
11. dodecane
12. butane
13. heptane

Trivial names for substituents

- isopropyl
- sec-butyl
- isobutyl
- tert-butyl
- tert-pentyl

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http://masterorganicchemistry.com
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For more complete resources on nomenclature consult:
1) “Organic Chemistry Online” by William Reusch: http://www2.chemistry.msu.edu/~facsuffi/teach/virtxtumlintro1.htm
2) IUPAC “Blue Book” http://www.acdlabs.com/iupac/nomenclature/