Organic Chemistry: Nomenclature

Table 1. Generic Names for the Alkanes and Radicals

Molecular Formula	Alkane Name	Radical Formula	Radical Name	Stem
CH_4	Methane	CH_3—	Methyl	Meth-
C_2H_6	Ethane	C_2H_5 —	Ethyl	Eth-
C_3H_8	Propane	C_3H_7 —	Propyl	Prop-
C_4H_{10}	Butane	C_4H_9—	Butyl	But-
C_5H_{12}	Pentane	C_5H_{11}—	Pentyl	Pent-
C_6H_{14}	Hexane	C_6H_{13}—	Hexyl	Hex-
C_7H_{16}	Heptane	C_7H_{15}—	Heptyl	Hept-
C_8H_{18}	Octane	C_8H_{17}—	Octyl	Oct-
C_9H_{20}	Nonane	C_9H_{19}–	Nonyl	Non-
$C_{10}H_{22}$	Decane	$C_{10}H_{21}$—	Decyl	Dec-

IUPAC System for Naming Alkanes

1. Select as the parent structure the longest continuous chain of carbon atoms, and then consider the compound to have been derived from this structure by the replacement of hydrogen with various alkyl groups.

2. Where necessary, use a number to indicate the carbon to which the alkyl group is attached – for example: 2-methylpentane.

3. In numbering the parent carbon chain, start at whichever end yields the smallest numbers in step #2. For example, the numbering would be chosen to yield 2-methylpentane and *not* 4-methylpentane.

4. If the same alkyl group occurs more than once as a side-chain, indicate the number of alkyl groups by the prefix “di”, “tri”, tetra-“, and so forth. Also, indicate the position of *each* group, as in 2,2,4-trimethylpentane.

5. If there are several different alkyl groups attached to the parent chain, name them in order of increasing size or in alphabetical order. An example of naming them in order of increasing size is 4-methyl-3,3-diethyl-5-propyldecane.