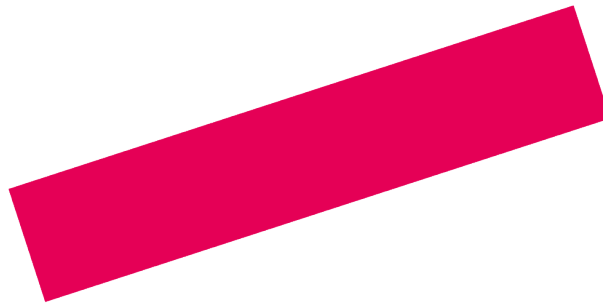


Academie toegepaste biowetenschappen en chemie

Chemie Course 3



Week 4: H12

Vandaag

Eigenschappen van organische moleculen

Functionele groepen

Structuren van alkanen

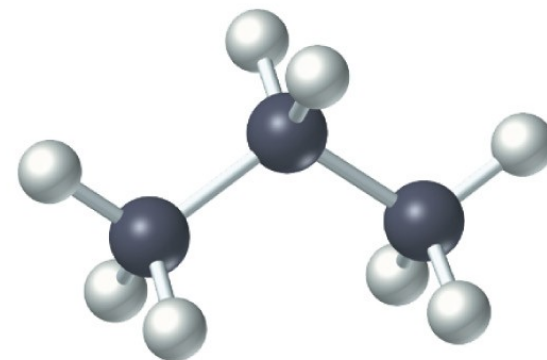
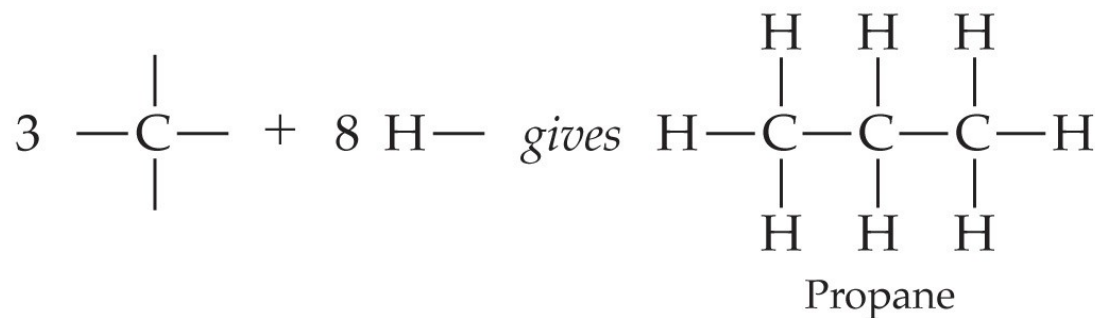
Tekenen van structuren

Vormen van organische moleculen

Benoemen van alkanen

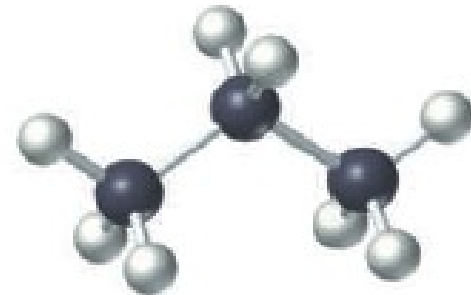
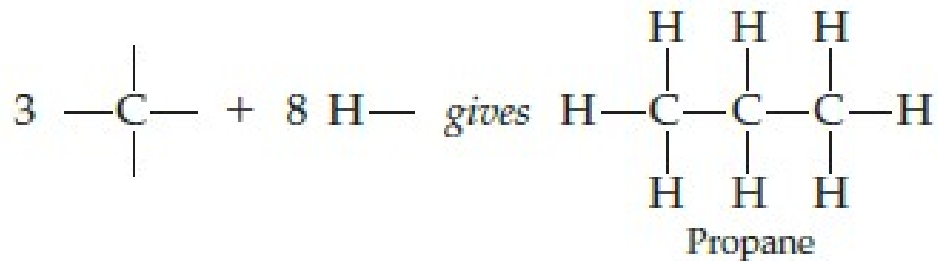
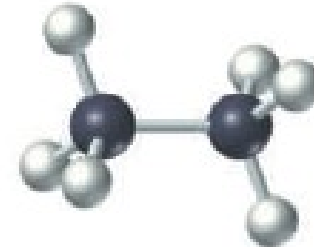
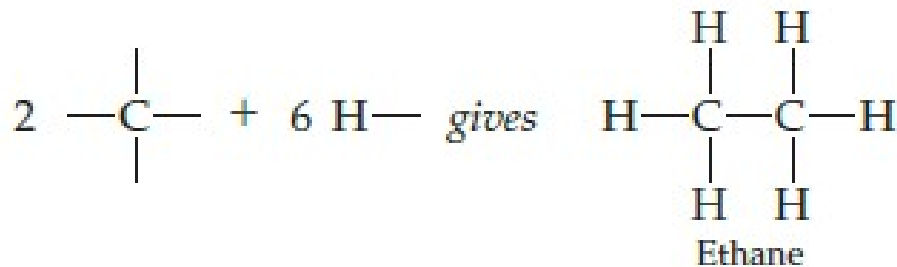
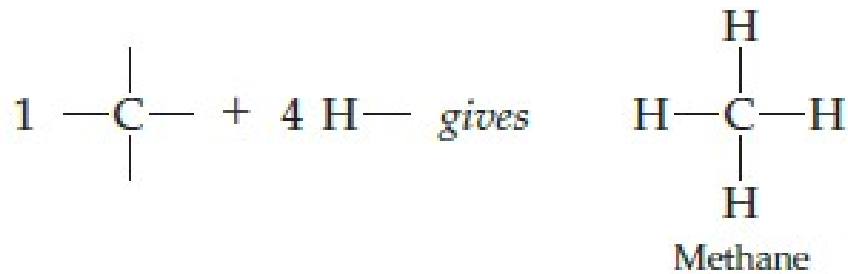
12.3 Structuur en isomerie

C_3H_8 : 1 isomeer

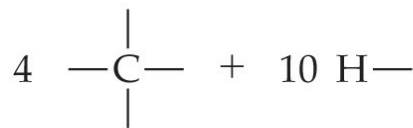


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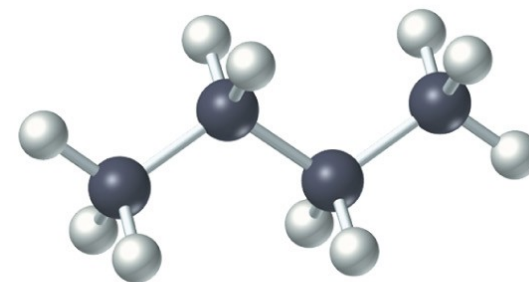
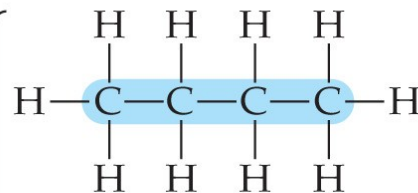
12.3 Structuur en isomerie



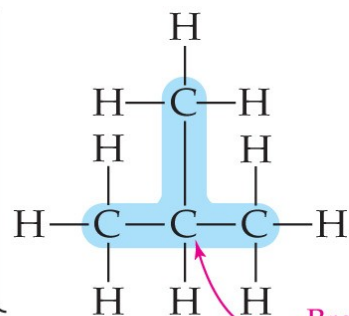
C_4H_{10} : 2 isomeren



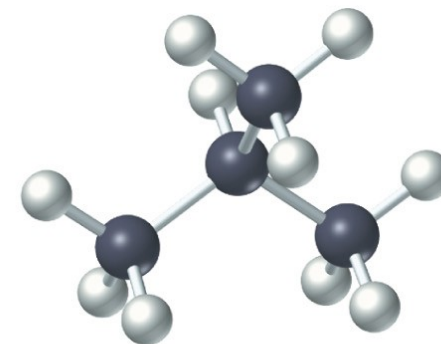
gives



Straight chain



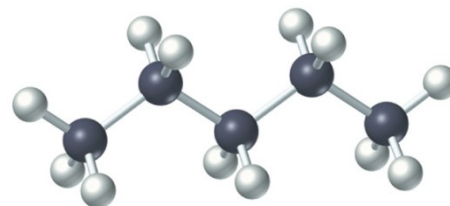
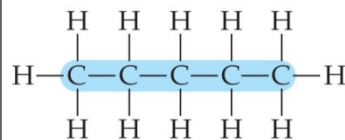
Branch point



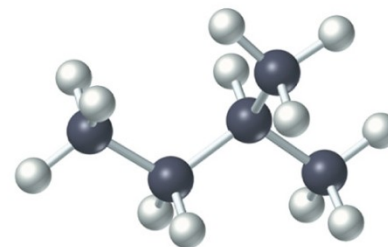
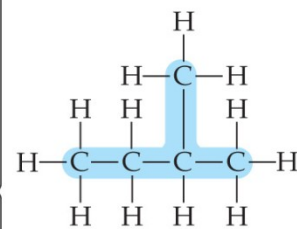
Branched chain

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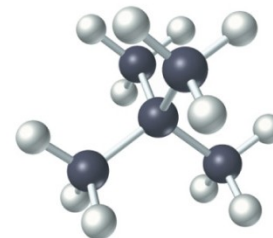
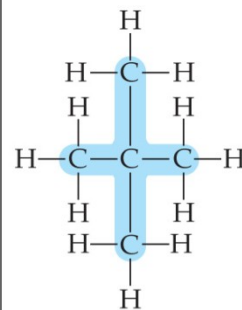
C_5H_{12} : 3 isomeren



Straight chain



Branched chain

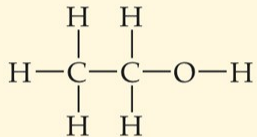
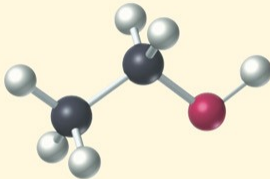
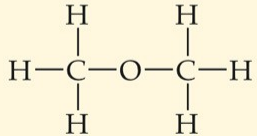
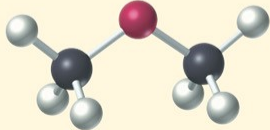


Branched chain

C_6H_{14} : 5 isomeren
 C_7H_{16} : 9 isomeren
 C_8H_{18} : 18 isomeren
 C_9H_{20} : 35 isomeren
 $C_{12}H_{26}$: 355 isomeren
 $C_{32}H_{66}$: 27.711.253.769 isomeren

Type-isomerie

TABLE 12.2 Some Properties of Ethyl Alcohol and Dimethyl Ether

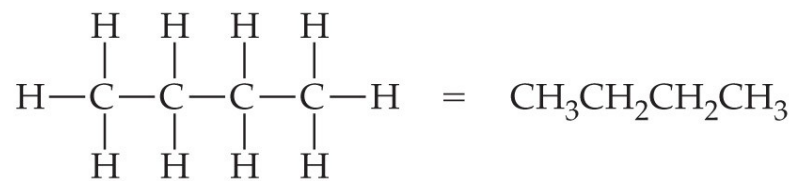
| NAME AND MOLECULAR FORMULA | STRUCTURE | BOILING POINT | MELTING POINT | PHYSIOLOGICAL ACTIVITY |
|-----------------------------|---|---------------|---------------|--|
| Ethyl alcohol C_2H_6O |   | 78.5 °C | - 117.3 °C | Central-nervous-system depressant |
| Dimethyl ether C_2H_6O |   | - 23 °C | - 138.5 °C | Nontoxic; anesthetic at high concentration |

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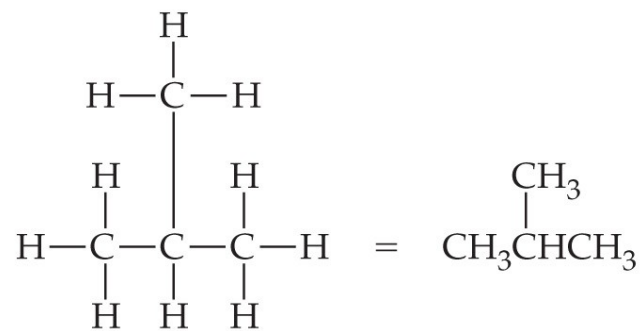
12.4 Structuren tekenen

Structureel

Gecondenseerd



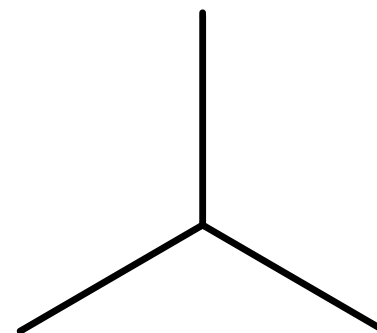
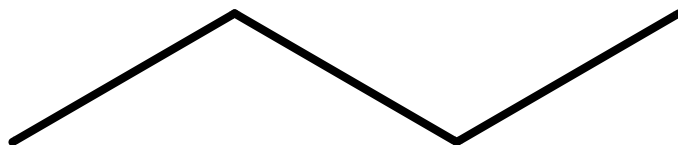
Butane



2-Methylpropane

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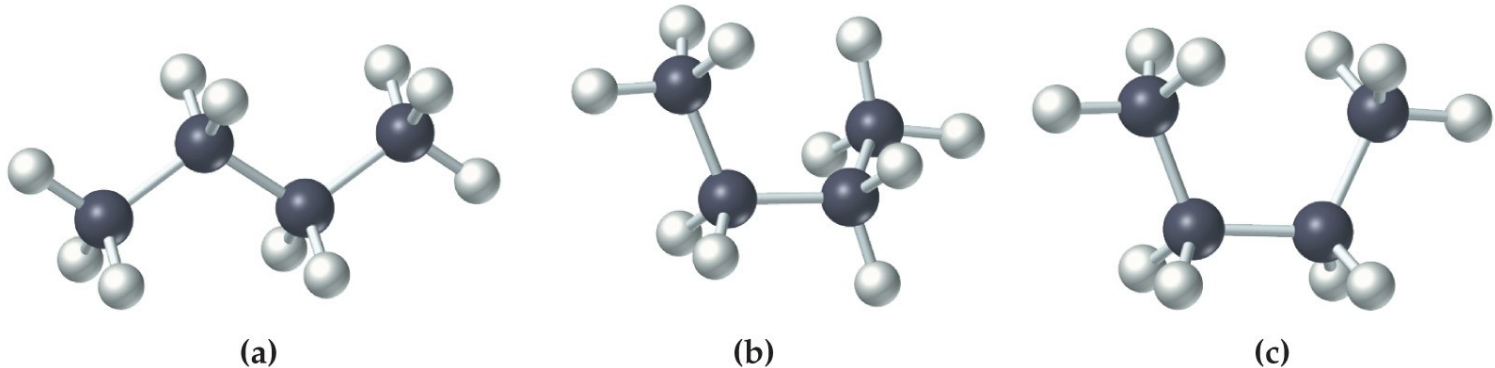
lijn structuur



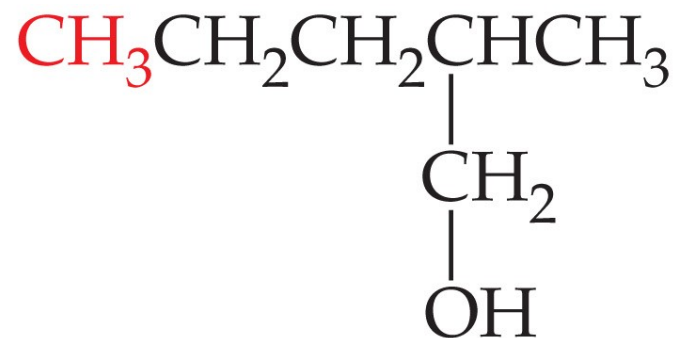
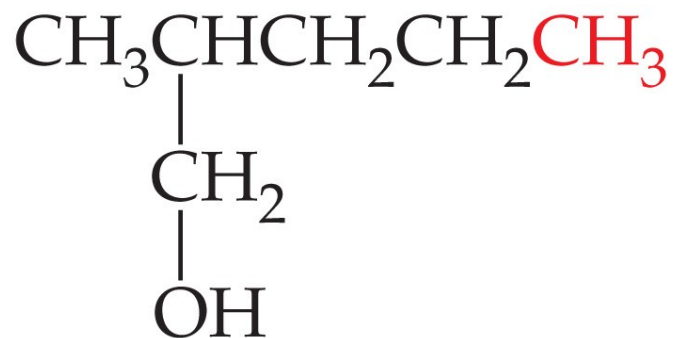
12.5 De vorm van moleculen

Conformatie = de driedimensionale rangschikking van atomen in een molecuul

- Hieronder 3 conformaties van butaan
- Butaan heeft oneindig veel conformaties



Onderstaande stoffen zijn identiek!!!



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12.5 De vorm van moleculen

Conformers

Isomeren

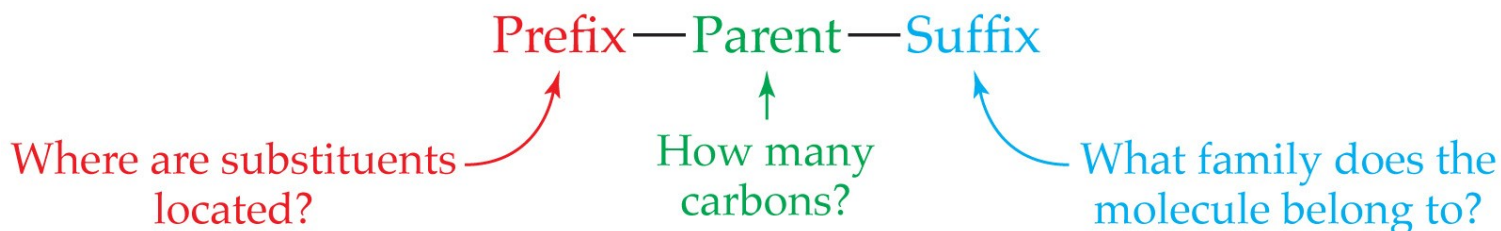
Ongerelateerd

12.6 Nomenclatuur alkanen

Naamgeving in regels vastgelegd

IUPAC

[International Union of Pure and Applied Chemistry](#)



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Stappen

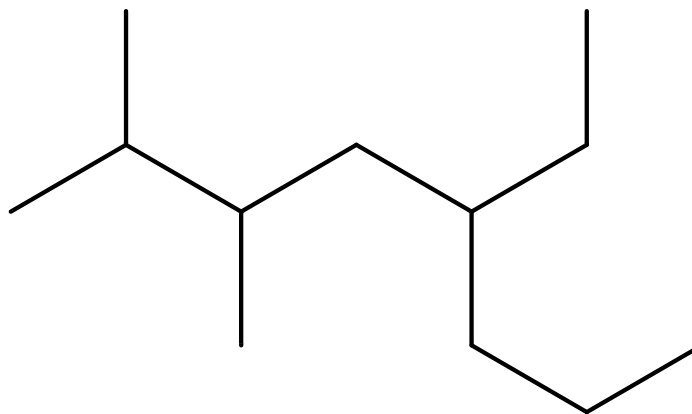
Zoek langste keten

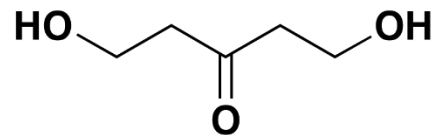
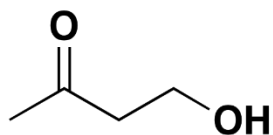
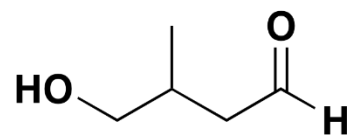
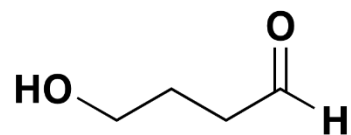
Geef C-atomen een nummer

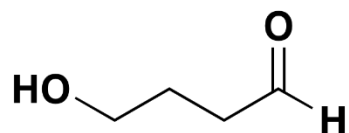
Welke zijketens zijn aanwezig

Alfabetische volgorde

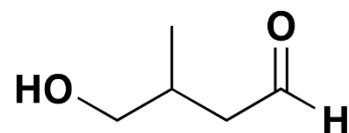
Schrijf naam als één woord



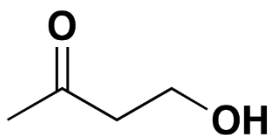




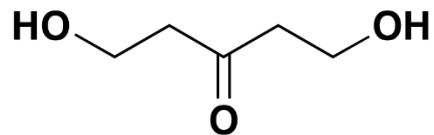
4-hydroxybutanal



4-hydroxy-3-methylbutanal



4-hydroxy-2-butanone



1,5-dihydroxy-3-pentanone

Table 2.1 Nomenclature and Physical Properties of Straight-Chain Alkanes

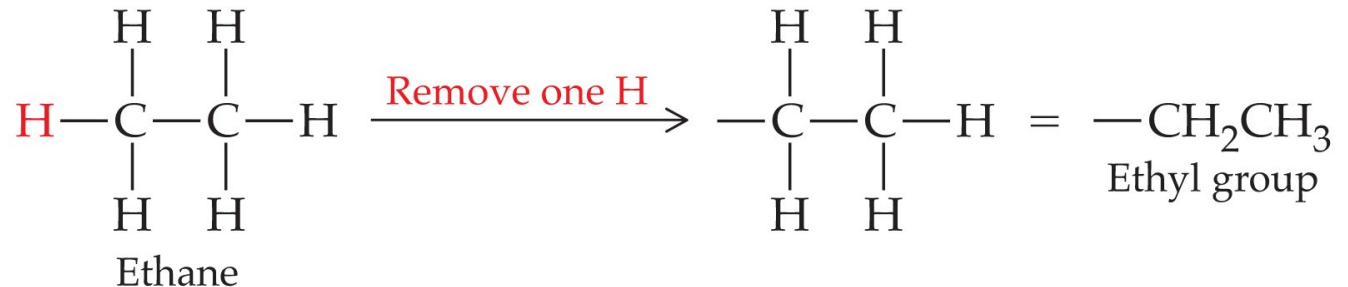
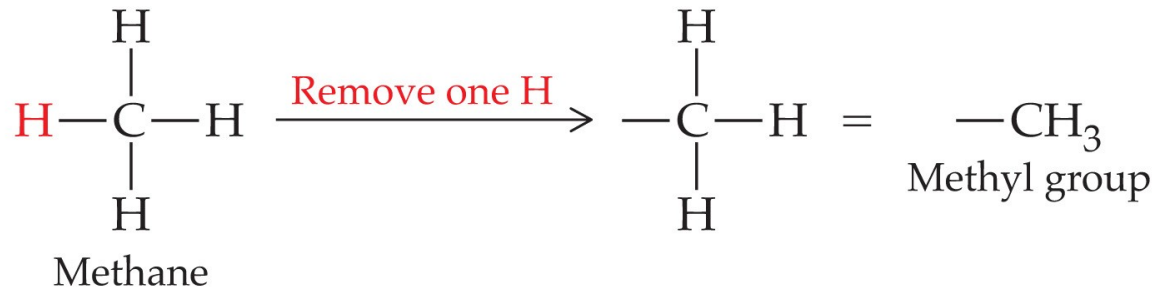
| Number of carbons | Molecular formula | Name | Condensed structure | Boiling point (°C) | Melting point (°C) | Density ^a (g/mL) |
|-------------------|---------------------------------|-------------|--|--------------------|--------------------|-----------------------------|
| 1 | CH ₄ | methane | CH ₄ | -167.7 | -182.5 | |
| 2 | C ₂ H ₆ | ethane | CH ₃ CH ₃ | -88.6 | -183.3 | |
| 3 | C ₃ H ₈ | propane | CH ₃ CH ₂ CH ₃ | -42.1 | -187.7 | |
| 4 | C ₄ H ₁₀ | butane | CH ₃ CH ₂ CH ₂ CH ₃ | -0.5 | -138.3 | |
| 5 | C ₅ H ₁₂ | pentane | CH ₃ (CH ₂) ₃ CH ₃ | 36.1 | -129.8 | 0.5572 |
| 6 | C ₆ H ₁₄ | hexane | CH ₃ (CH ₂) ₄ CH ₃ | 68.7 | -95.3 | 0.6603 |
| 7 | C ₇ H ₁₆ | heptane | CH ₃ (CH ₂) ₅ CH ₃ | 98.4 | -90.6 | 0.6837 |
| 8 | C ₈ H ₁₈ | octane | CH ₃ (CH ₂) ₆ CH ₃ | 125.7 | -56.8 | 0.7026 |
| 9 | C ₉ H ₂₀ | nonane | CH ₃ (CH ₂) ₇ CH ₃ | 150.8 | -53.5 | 0.7177 |
| 10 | C ₁₀ H ₂₂ | decane | CH ₃ (CH ₂) ₈ CH ₃ | 174.0 | -29.7 | 0.7299 |
| 11 | C ₁₁ H ₂₄ | undecane | CH ₃ (CH ₂) ₉ CH ₃ | 195.8 | -25.6 | 0.7402 |
| 12 | C ₁₂ H ₂₆ | dodecane | CH ₃ (CH ₂) ₁₀ CH ₃ | 216.3 | -9.6 | 0.7487 |
| 13 | C ₁₃ H ₂₈ | tridecane | CH ₃ (CH ₂) ₁₁ CH ₃ | 235.4 | -5.5 | 0.7546 |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| 20 | C ₂₀ H ₄₂ | eicosane | CH ₃ (CH ₂) ₁₈ CH ₃ | 343.0 | 36.8 | 0.7886 |
| 21 | C ₂₁ H ₄₄ | heneicosane | CH ₃ (CH ₂) ₁₉ CH ₃ | 356.5 | 40.5 | 0.7917 |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| 30 | C ₃₀ H ₆₂ | triacontane | CH ₃ (CH ₂) ₂₈ CH ₃ | 449.7 | 65.8 | 0.8097 |

^aDensity is temperature dependent. The densities given are those determined at 20 °C (d^{20°).

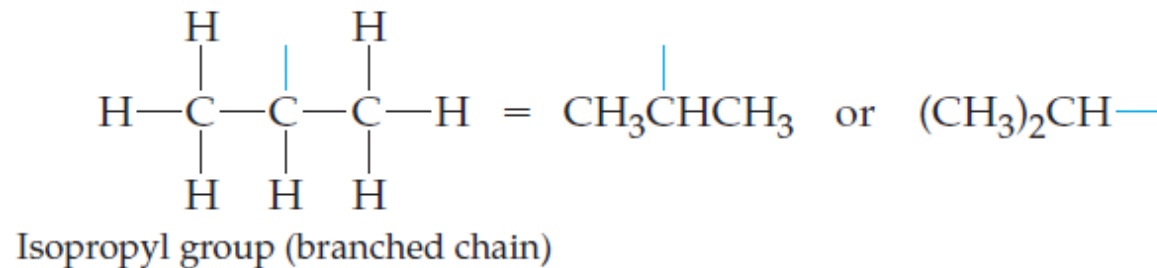
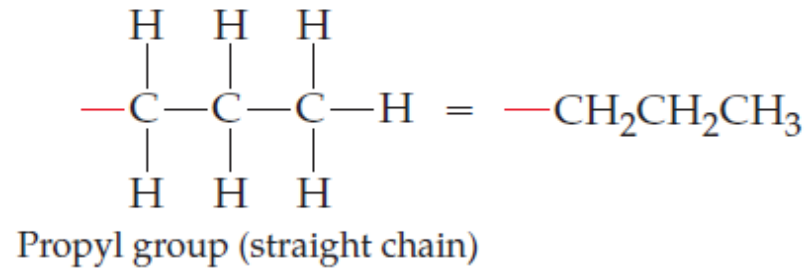
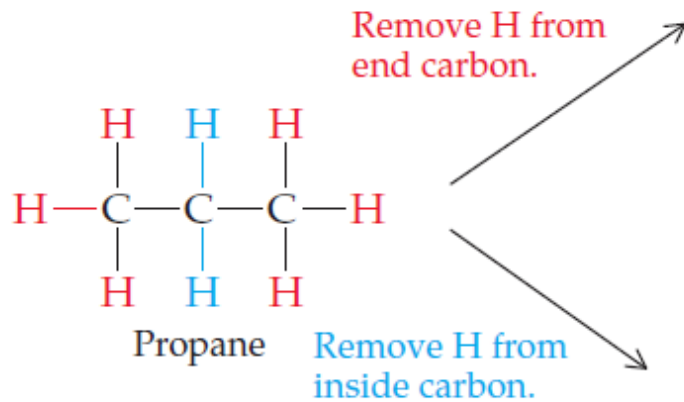
Alkylgroepen

Vertakkingen van de zijketen

Alkyl groups are derived from a parent alkane.

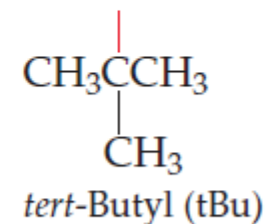
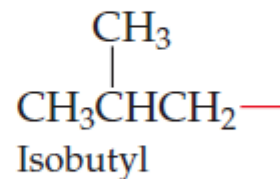
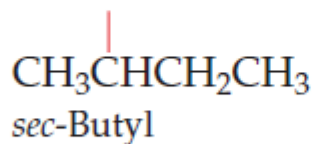
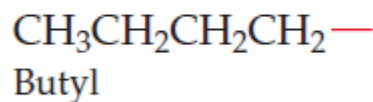
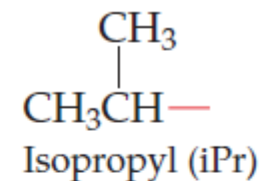
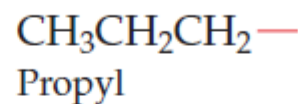
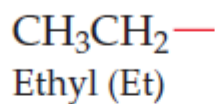
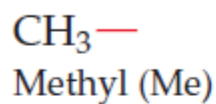


Alkylgroepen



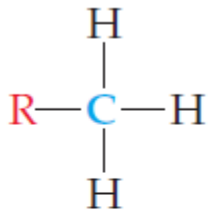
Wat veelgebruikte alkylgroepen

Some Common Alkyl Groups (and their abbreviations)*

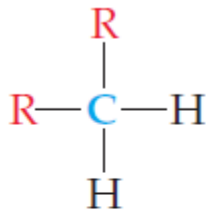


*The red bond shows the connection to the rest of the molecule.

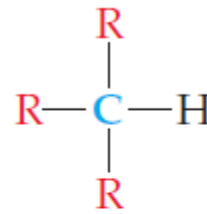
primair, secundair, tertiair en quaternair



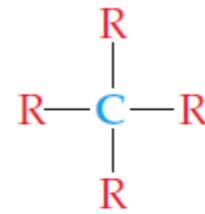
Primary carbon
(1°) has one other
carbon attached.



Secondary carbon
(2°) has two other
carbons attached.



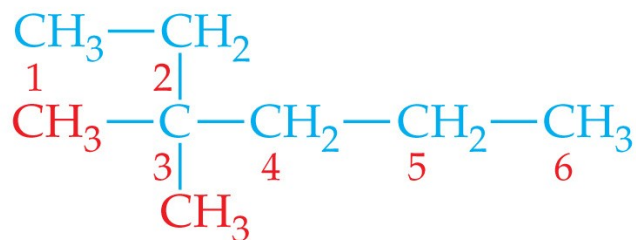
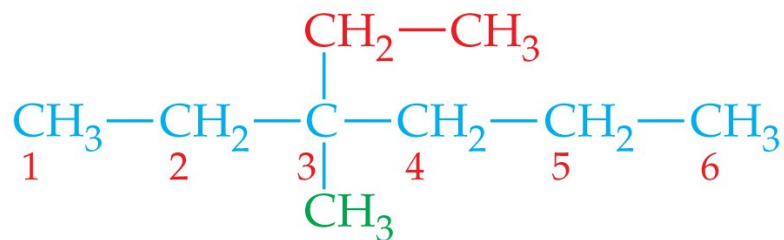
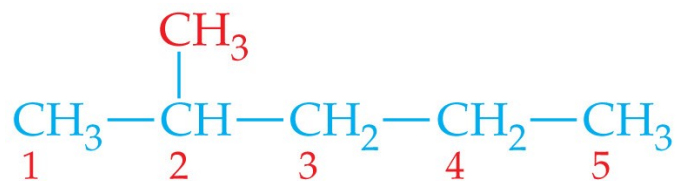
Tertiary carbon
(3°) has three other
carbons attached.



Quaternary carbon
(4°) has four other
carbons attached.

R represents a linkage to another C.

Benoemen



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Nu

Maken t/m 12.15

Bronnen

Afbeeldingen afkomstig van:

- McMurry - Fundamentals of general, organic, and biological chemistry. 7th edition, uitgever: Pearson.
 - Veplicht boek boekenlijst opleiding