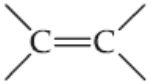
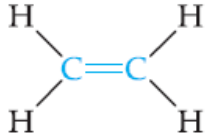
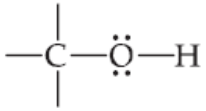
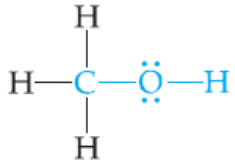
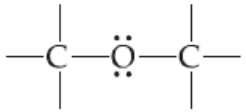
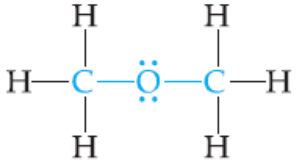
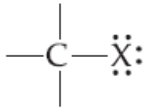
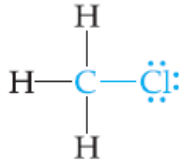
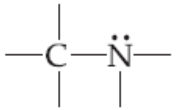
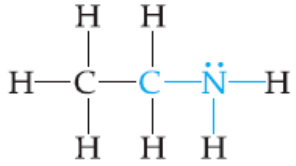
Disciplina: SQM0485

Prof. Dr. Andrei Leitão

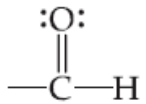
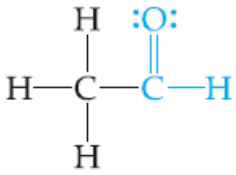
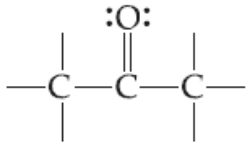
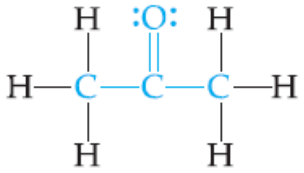
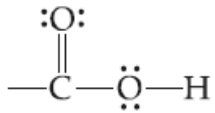
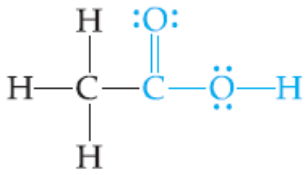
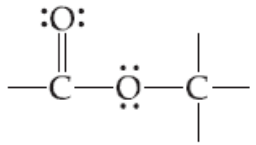
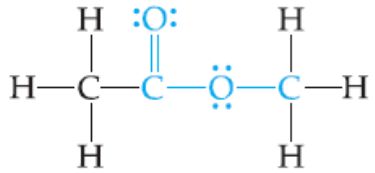
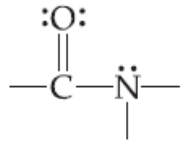
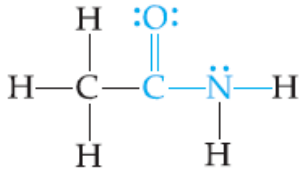
Química do Carbono:

Alcanos, Alquenos, Alquinos

Compostos orgânicos

Functional Group	Type of Compound	Suffix or Prefix	Example	Systematic Name (common name)
	Alkene	*-ene*		Ethene (Ethylene)
	Alkyne	*-yne*		Ethyne (Acetylene)
	Alcohol	*-ol*		Methanol (Methyl alcohol)
	Ether	*ether*		Dimethyl ether
 (X = halogen)	Haloalkane	*halo-*		Chloromethane (Methyl chloride)
	Amine	*-amine*		Ethylamine

Compostos orgânicos (2)

Functional Group	Type of Compound	Suffix or Prefix	Example	Systematic Name (common name)
	Aldehyde	*-al*		Ethanal (Acetaldehyde)
	Ketone	*-one*		Propanone (Acetone)
	Carboxylic acid	*-oic acid*		Ethanoic acid (Acetic acid)
	Ester	*-oate*		Methyl ethanoate (Methyl acetate)
	Amide	*-amide*		Ethanamide (Acetamide)

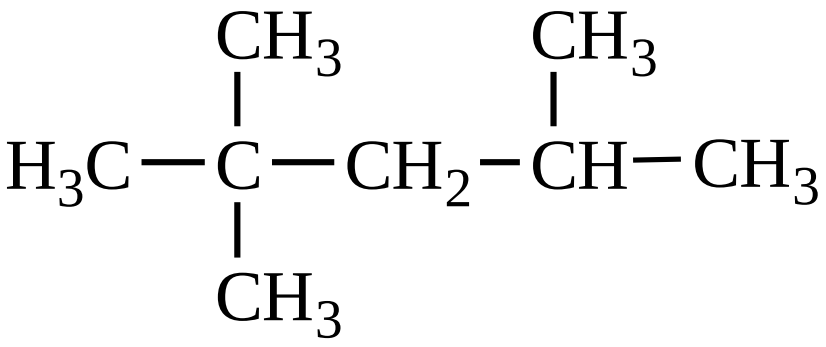
Nomenclatura

- ✓ **Alcanos:** C_nH_{2n+2} (saturados)
- ✓ **Cicloalcanos:** C_nH_{2n} (somente um anel)
- ✓ **Alquenos:** C_nH_{2n} (com uma insaturação)
- ✓ **Alquinos:** C_nH_{2n-2} (com uma ligação tripla)

Obtenção dos alcanos

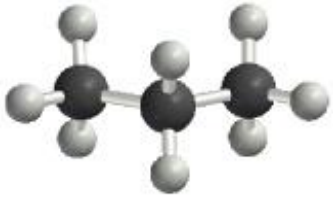
Ponto de ebulição (°C)	**Número de átomos de carbono na molécula**	**Uso**
Abaixo de 20	C_1–C_4	Gás natural, gás encanado, petroquímicos
20–60	C_5–C_6	Éter de petróleo, solventes
60–100	C_6–C_7	Solventes
40–200	C_5–C_{10}	Gasolina
175–325	C_{12}–C_{18}	Querosene e combustível de jeto
250–400	C_{12} e maior	Combustível and díesel
Líquidos não voláteis	C_{20} e maior	Óleo mineral refinado, óleo lubricante, graxa
Sólidos não voláteis	C_{20} e maior	Cera de parafina, asfalto

Índice de octanagem



2,2,4-trimetilpentano (“**isooctano**”)

Nomenclatura (2)

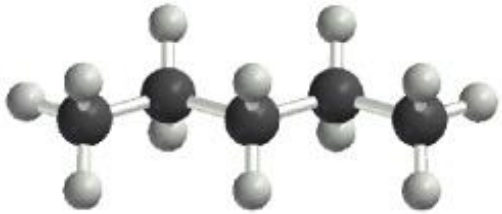


Propano

$CH_3CH_2CH_3$

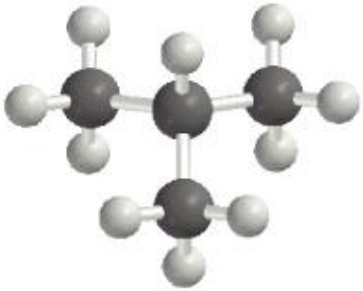
Butano

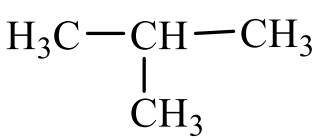
$CH_3CH_2CH_2CH_3$



Pentano

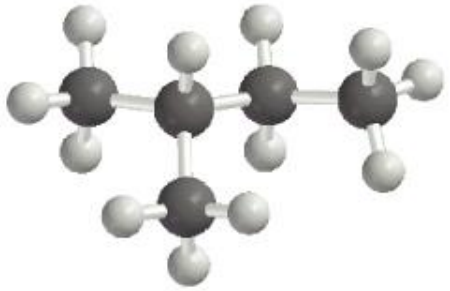
$CH_3CH_2CH_2CH_2CH_3$

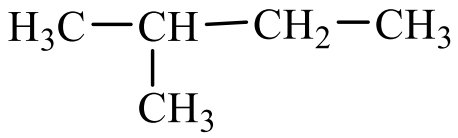




Isobutano

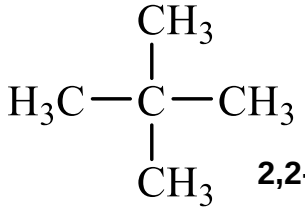
2-metilpropano





Isopentano

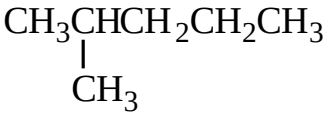
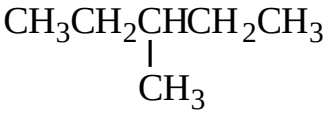
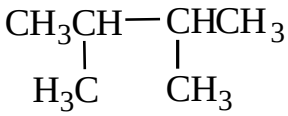
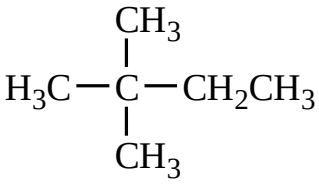
2-metilbutano



Neopentano

2,2-dimetilpropano

Propriedades físicas

Fórmula molecular	Fórmula estrutural	PF (°C)	PE (°C)[a] (1 atm)	Densidade (g mL^{-1})
C_6H_{14}	$CH_3CH_2CH_2CH_2CH_2CH_3$	–95	68,7	0,6594
C_6H_{14}		–153,7	60,3	0,6532
C_6H_{14}		–118	63,3	0,6643
C_6H_{14}		–128,8	58	0,6616
C_6H_{14}		–98	49,7	0,6492

Número de isômeros possíveis

Fórmula molecular	Número de isômeros constitucionais possíveis	Fórmula molecular	Número de isômeros constitucionais possíveis
C_4H_{10}	2	$C_{10}H_{22}$	75
C_5H_{12}	3	$C_{11}H_{24}$	159
C_6H_{14}	5	$C_{15}H_{32}$	4.347
C_7H_{16}	9	$C_{20}H_{42}$	366.319
C_8H_{18}	18	$C_{30}H_{62}$	4111.846.763
C_9H_{20}	35	$C_{40}H_{82}$	**62.481.801.147.341**

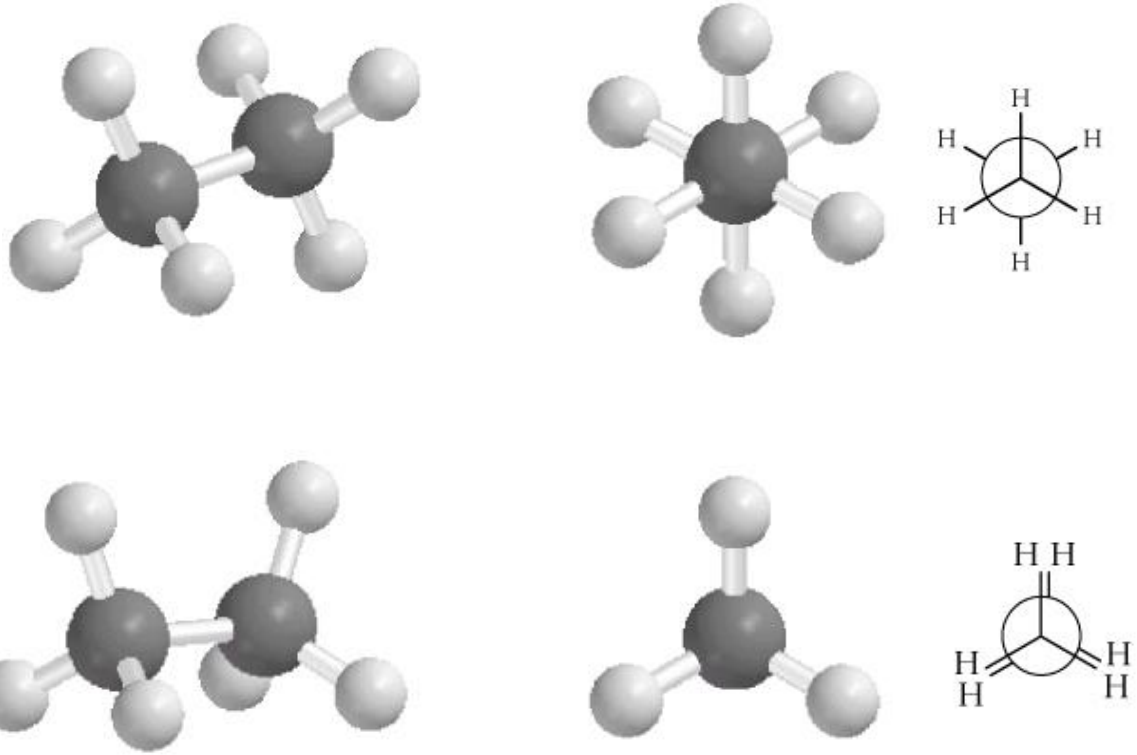
Alcanos sem ramificação

Número de carbonos (n)	*Nome*	*Fórmula* (C_nH_{2n+2})	*Número de carbonos (n)*	*Nome*	*Fórmula* (C_nH_{2n+2})
1	Metano	CH_4	13	Tridecano	$C_{13}H_{28}$
2	Etano	C_2H_6	14	Tetradecano	$C_{14}H_{30}$
3	Propano	C_3H_8	15	Pentadecano	$C_{15}H_{32}$
4	Butano	C_4H_{10}	16	Hexadecano	$C_{16}H_{34}$
5	Pentano	C_5H_{12}	17	Heptadecano	$C_{17}H_{36}$
6	Hexano	C_6H_{14}	18	Octadecano	$C_{18}H_{38}$
7	Heptano	C_7H_{16}	19	Nonadecano	$C_{19}H_{40}$
8	Octano	C_8H_{18}	20	Eicosano	$C_{20}H_{42}$
9	Nonano	C_9H_{20}	21	Henicosano	$C_{21}H_{44}$
10	Decano	$C_{10}H_{22}$	22	Docosano	$C_{22}H_{46}$
11	Undecano	$C_{11}H_{24}$	23	Tricosano	$C_{23}H_{48}$
12	Dodecano	$C_{12}H_{26}$	30	Triacontano	$C_{30}H_{62}$

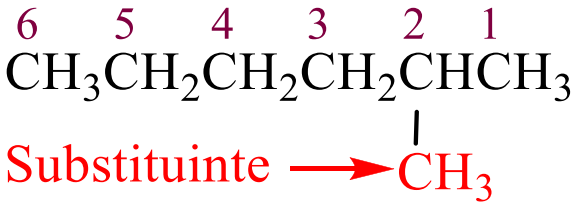
Alcanos como substituintes

Alcano		Group alquila	Abreviação
CH_3—**H** **Metano**	Se torna	CH_3— **Metil**	Me–
CH_3CH_2—**H** **Etano**	Se torna	CH_3CH_2— **Etil**	Et–
$CH_3CH_2CH_2$—**H** **Propano**	Se torna	$CH_3CH_2CH_2$— **Propil**	Pr–
$CH_3CH_2CH_2CH_2$—**H** **Butano**	Se torna	$CH_3CH_2CH_2CH_2$— **Butil**	Bu–

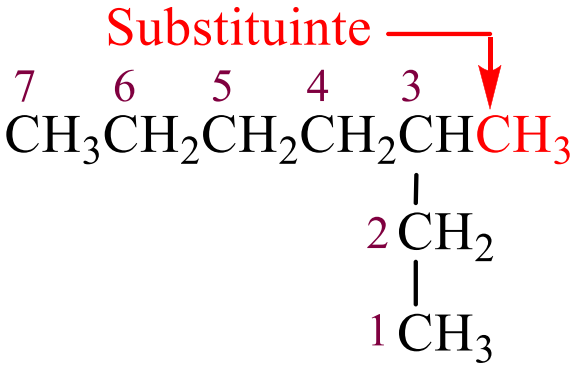
Conformações em alcanos



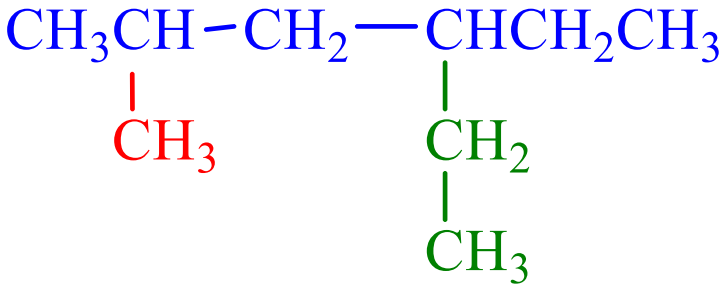
Alcanos com ramificação



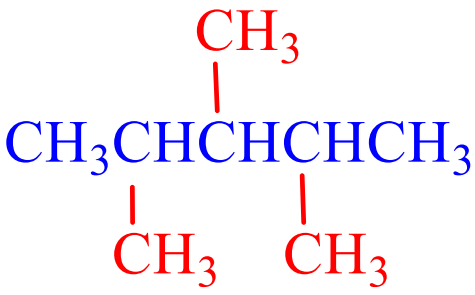
2-metilhexano



3-metilheptano

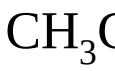


4-etil-2-metilhexano



2,3,4-trimetilpentano

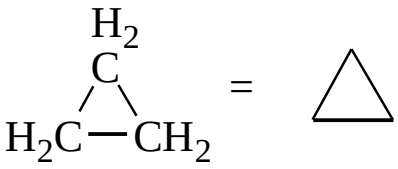
Haletos de alquila & cicloalcanos



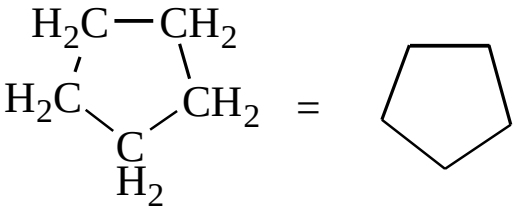
Cloroetano
cloreto de etila

1-Fluoropropano
fluoreto de *n*-propila

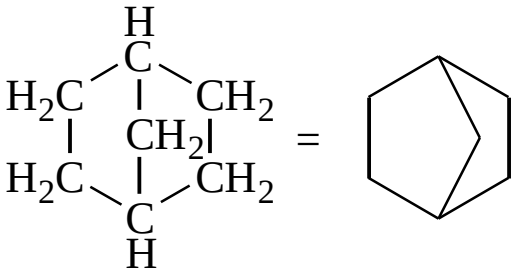
2-Bromopropano
brometo de isopropila



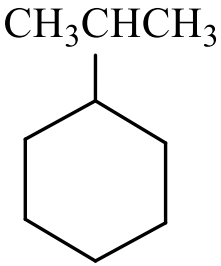
Ciclopropano



Ciclopentano

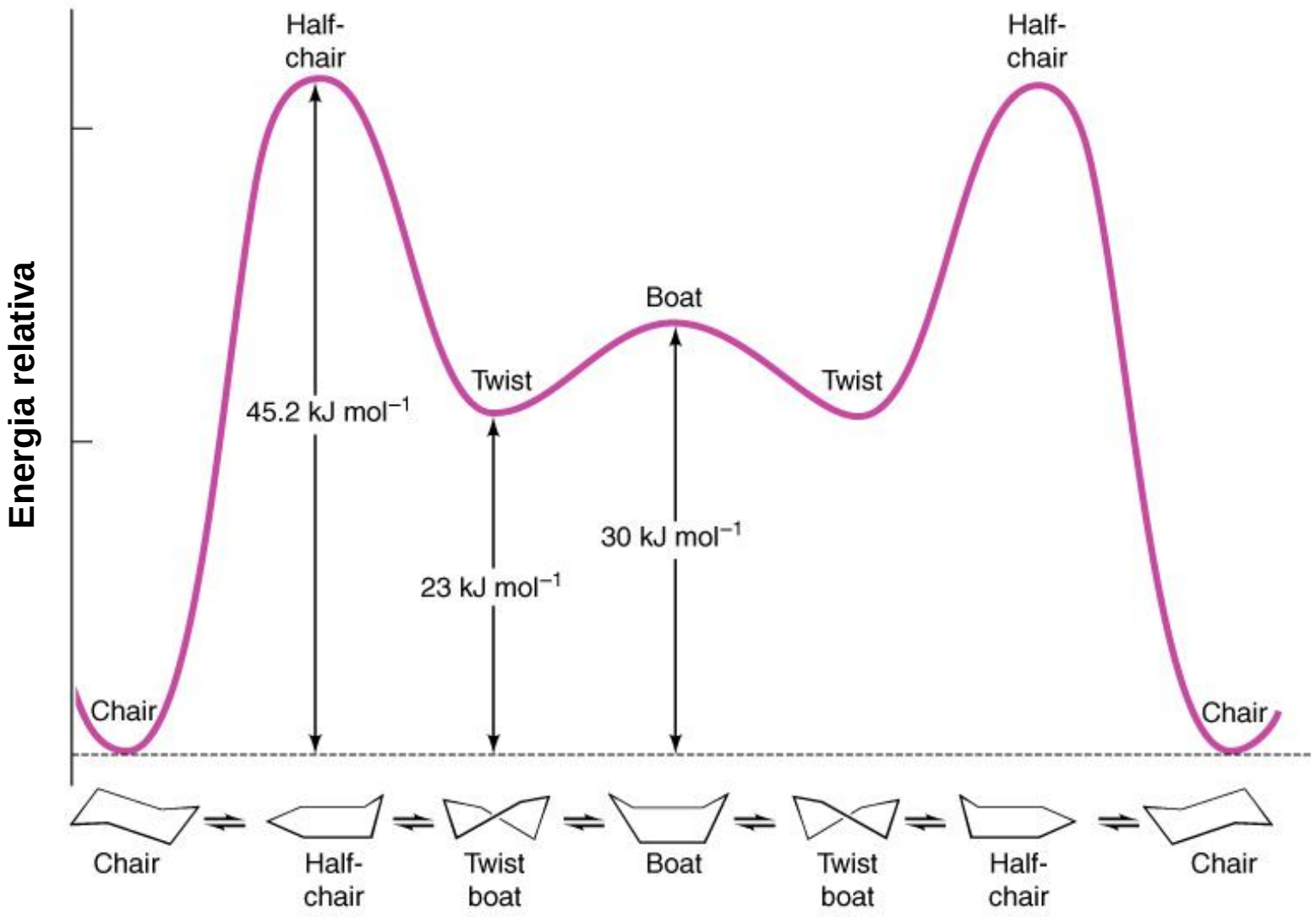


Biciclo[2.2.1]heptano



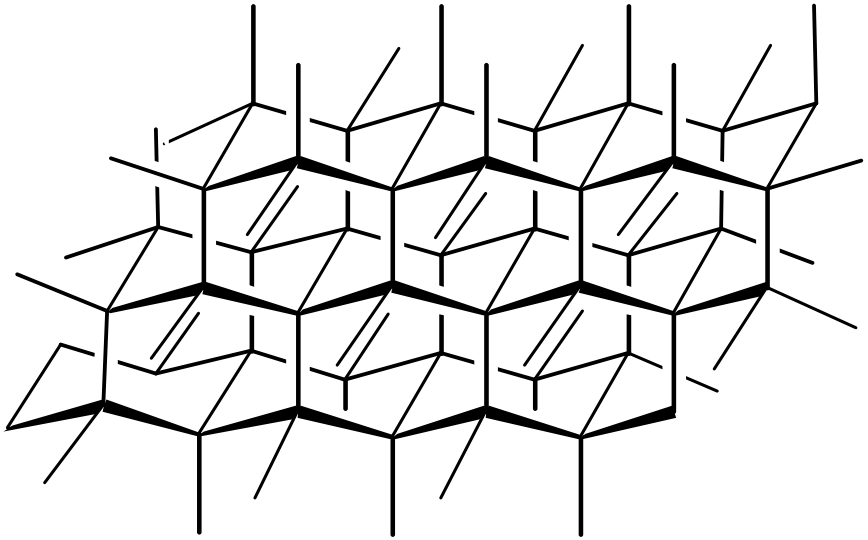
Isopropilciclohexano

Conformação em ciclohexano

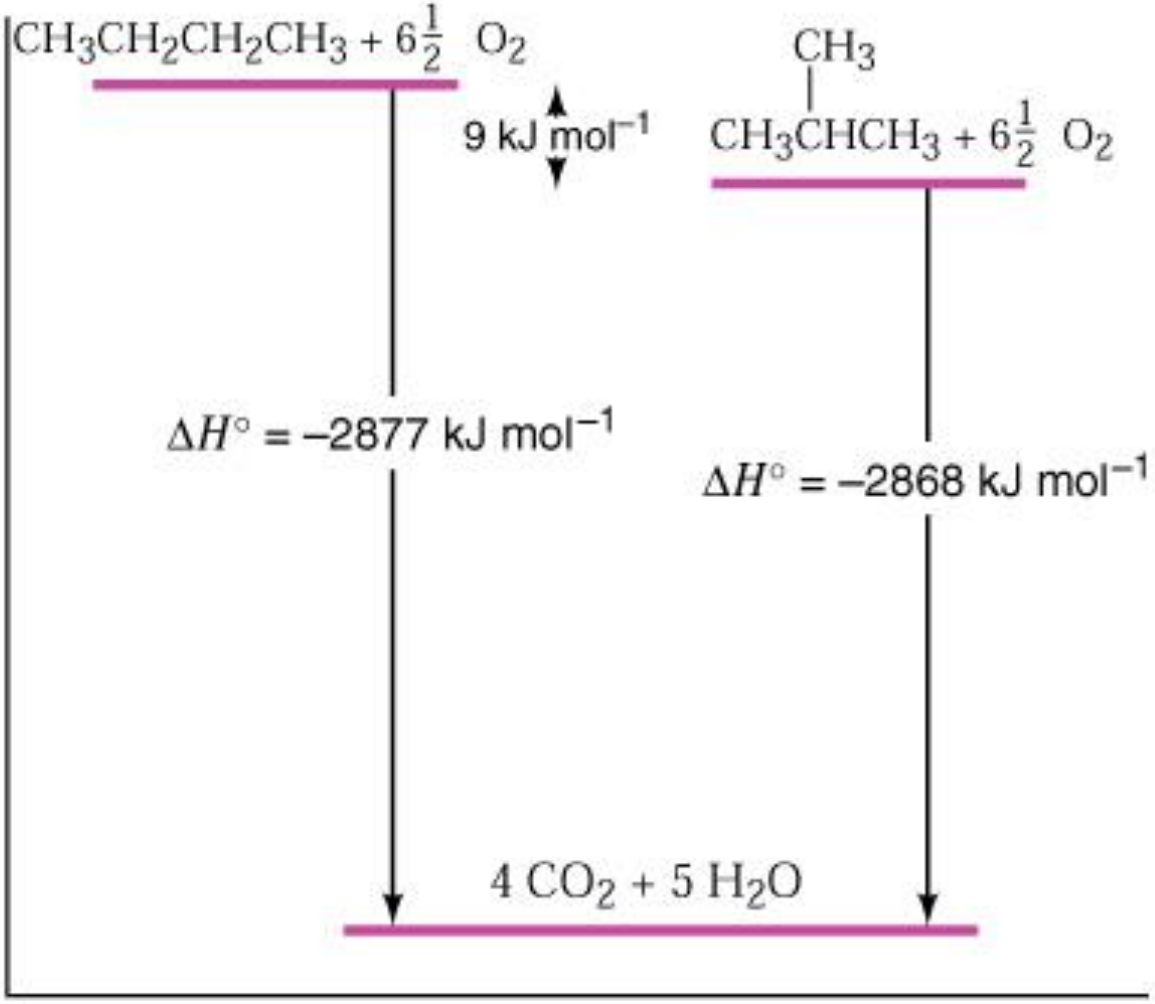


Forma alotrópica do carbono

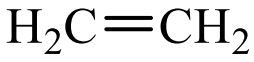
diamante

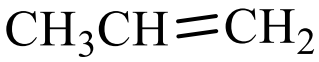


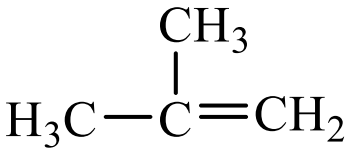
Combustão de alcanos



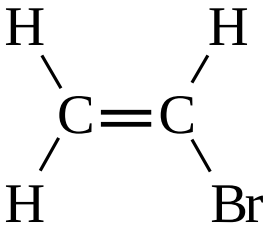
Alquenos



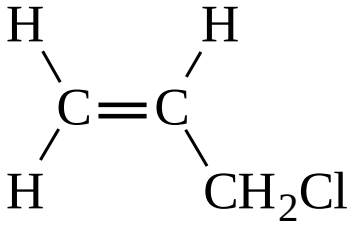




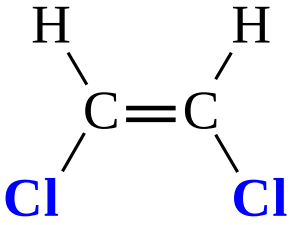
IUPAC:	**Eteno**	**Propeno**	**2-Metilpropeno**
Comum:	**Etileno**	**Propileno**	**Isobutileno**



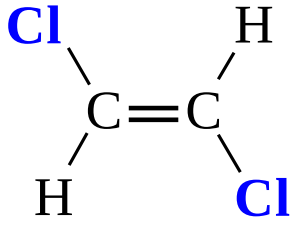
Bromoeteno



3-Cloropropeno



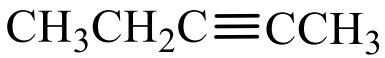
(*Z*)-1,2-dicloroeteno



(*E*)-1,2-dicloroeteno

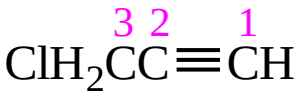
Alquinos

etino ou **acetileno**

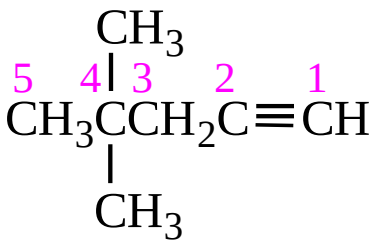


2-pentino

1-penten-4-ino



3-cloropropino



4,4-dimetil-1-pentino