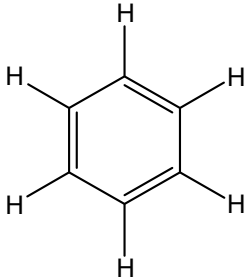


Nomenclatura e grupos funcionais

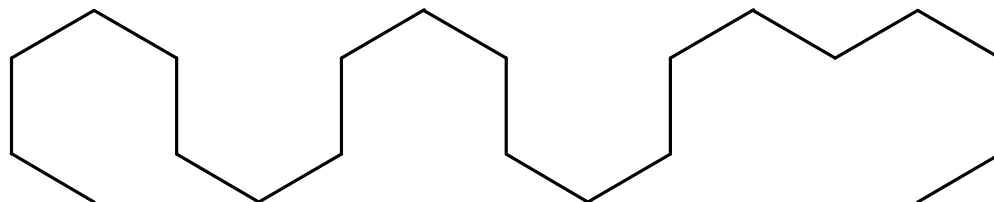
Grupos funcionais: átomos ou grupos de átomos que apresentam uma grande constância de propriedades em moléculas com estruturas diversas. O grupo apresenta uma reactividade tipo que permite sistematização e previsão.

Hidrocarbonetos: moléculas com C e H

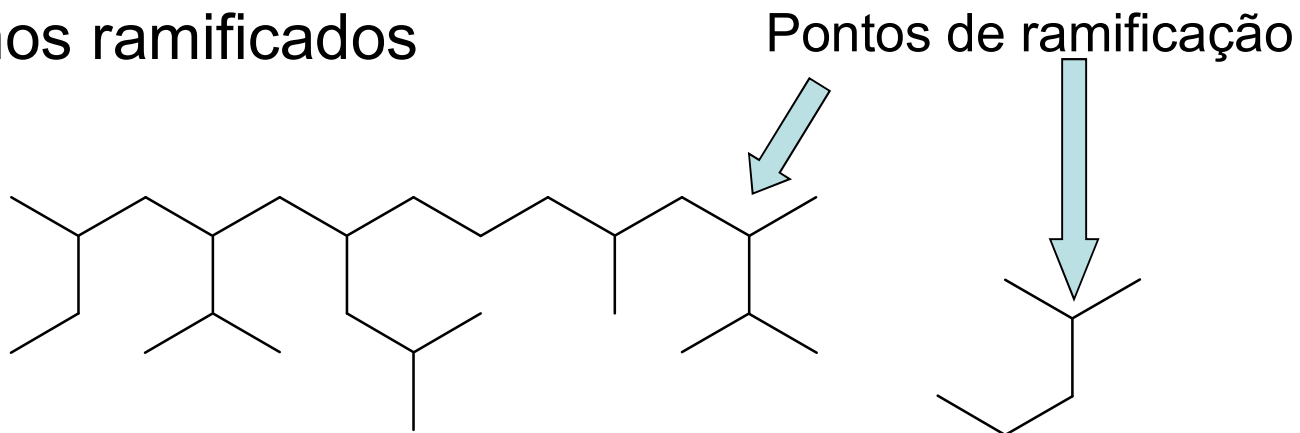
		<u>Fórmula</u>	<u>Nome</u>	<u>Terminação</u>	
Hidro- carbonetos	Alifáticos	C_nH_{2n+2}	Alcanos	-ano	Compostos saturados
		C_nH_{2n}	Alcenos	-eno	
		C_nH_{2n-2}	Alcinos	-ino	
	Alicíclicos (ou Cíclicos)		C_nH_{2n}	Cicloalcanos	
		Aromáticos	Hidrocarbonetos cíclicos com um número de electrões π conjugados igual a $4n+2$.		
		Ex: benzeno			

Alcanos

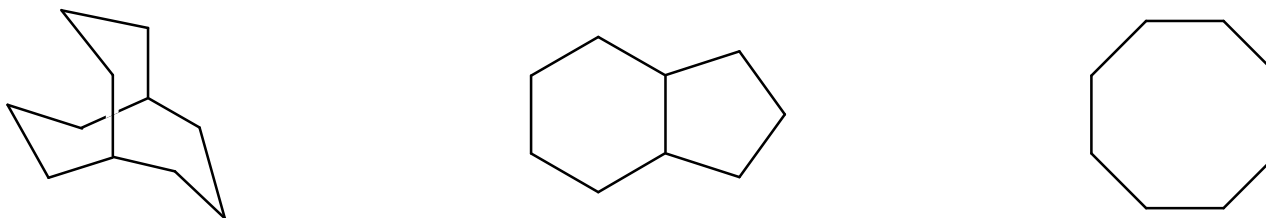
- Alcanos lineares



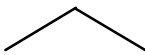
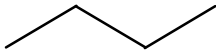
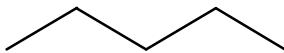

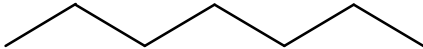
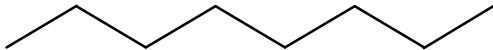
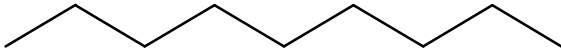

- Alcanos ramificados



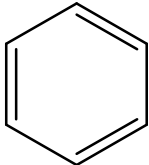
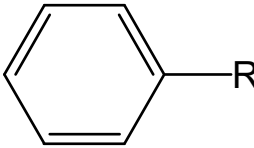
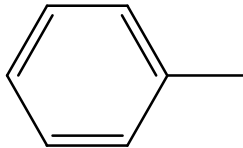
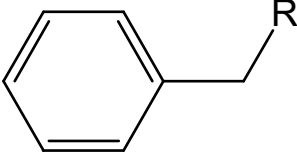
- Alcanos cíclicos



Nomes de cadeias carbonadas

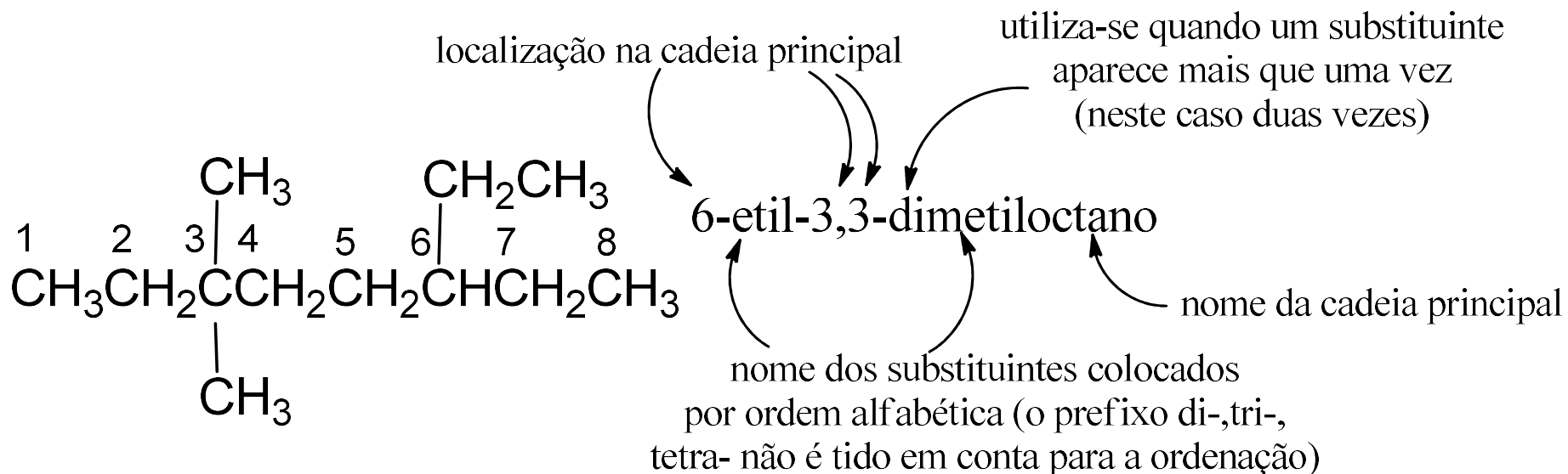
Nº de C	Nome	Fórmula
1	Metano	CH ₄
2	Etano	CH ₃ CH ₃
3	Propano	
4	Butano	
5	Pentano	
6	Hexano	
7	Heptano	
8	Octano	
9	Nonano	
10	Decano	

Nomes de alguns substituintes carbonados

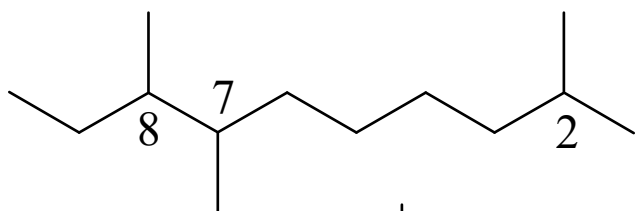
Molécula	Substituinte
Metano ; CH_4	Metil(o)- ; $\text{CH}_3\text{—R}$
Etano ; CH_3CH_3	Etil(o) ; $\text{CH}_3\text{CH}_2\text{—R}$
Propano ; $\text{CH}_3\text{CH}_2\text{CH}_3$	Propil(o) ; $\text{CH}_3\text{CH}_2\text{CH}_2\text{—R}$
Butano ; $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$	Butil(o) ; $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{—R}$
Benzeno ; C_6H_6 	Fenil(o) ; $\text{C}_6\text{H}_5\text{—R}$ 
Tolueno ; $\text{C}_6\text{H}_5\text{CH}_3$ 	Benzil(o) ; $\text{C}_6\text{H}_5\text{CH}_2\text{—R}$ 

Nomenclatura de alcanos e haloalcanos

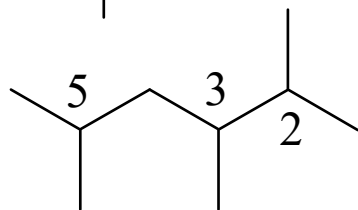
- 1 – Determinar a cadeia de carbonos mais comprida.
- 2 – Caso sejam possíveis várias cadeias com o número máximo de carbonos, definir a mais ramificada como principal.
- 3 – Dar nomes a cada ramificação.
- 4 – Ordenar as ramificações por ordem alfabética.
- 5 – Numerar a cadeia principal de modo que seja atribuída à 1ª ramificação o número mais baixo possível.
- 6 – Em caso de igualdade de distância das extremidades da primeira ramificação, usar a numeração que dá menor número ao substituinte que alfabeticamente terá prioridade
- 7 – Compor o nome, do seguinte modo:



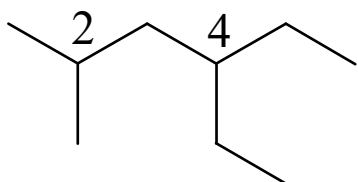
Nomenclatura de alcanos e haloalcanos



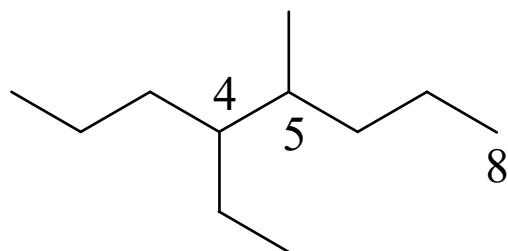
2,7,8-Trimetildecano
(e não 3,4,9-Trimetildecano)



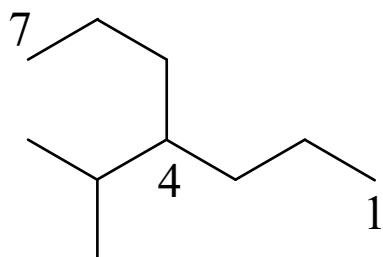
2,3,5-Trimetil-hexano
(não 2,4,5-Trimetil-hexano)



4-Etil-2-metil-hexano
(não 2-Metil-4-etil-hexano)

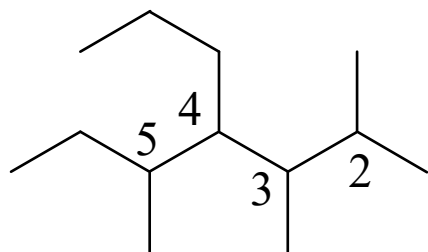


4-Etil-5-metiloctano
(não 5-Etil-4-metiloctano)

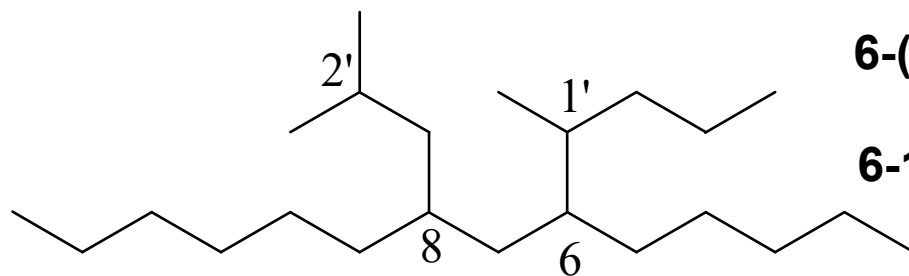


4-Isopropil-heptano
ou **4-(Metiletil)-heptano**
(não 2-Metil-3-propil-hexano)

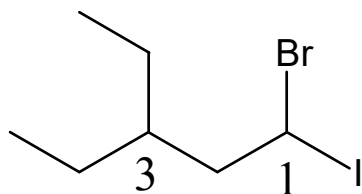
Nomenclatura de alcanos e haloalcanos



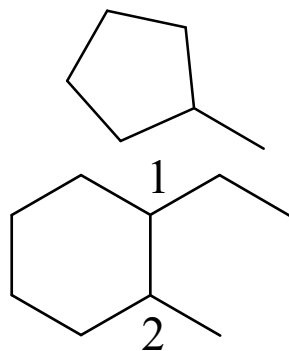
2,3,5-Trimetil-4-propil-heptano
(e não 4-Sec-butil-2,3-dimetil-heptano)



6-(1-Metilbutil)-8-(2-metilpropil)-tetradecano
ou
6-1'-Metilbutil-8-2'-metilpropiltetradecano



1-Bromo-3-etil-1-iodo-pentano
(os halogénios são tratados do mesmo modo que grupos alquilo)

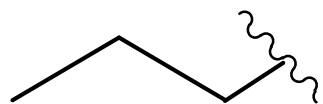


Metil-ciclopentano

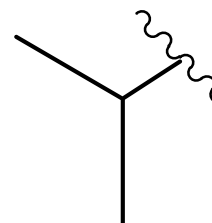
1-Etil-2-metil-ciclo-hexano

Alguns substituintes alquílicos comuns

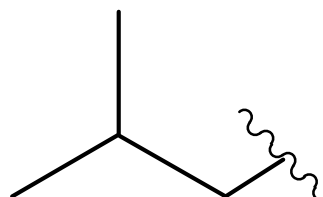
Também são por vezes apelidados de radicais.



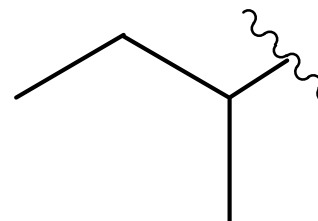
***n*-Propilo**



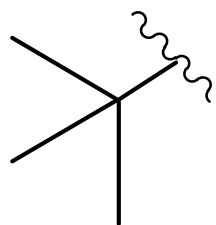
Isopropilo



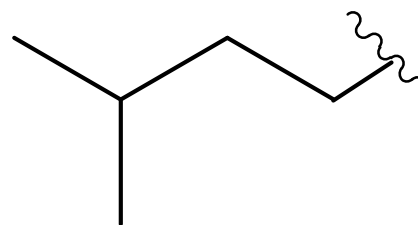
Isobutilo



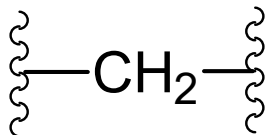
sec-Butilo



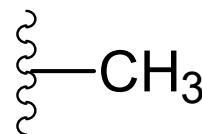
***tert*-Butilo**



Isopentilo



Metileno

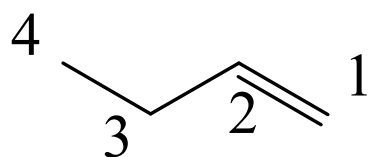


Metilo

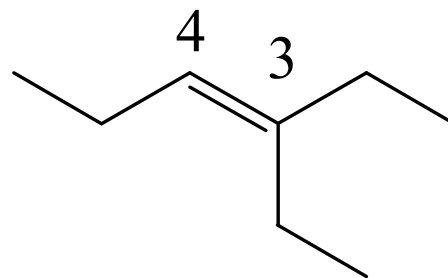
Nomenclatura de alcenos e alcinos

1 – A cadeia principal será a maior cadeia carbonada que contém pelo menos uma insaturação (e terá que incluir ambos os carbonos da insaturação). As regras de nomenclatura são semelhantes às dos alcanos. Muda-se a terminação do nome da cadeia principal de “ano” para “eno” (dupla) ou “ino” (tripla).

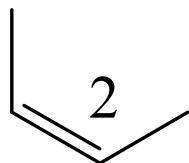
2 – Numera-se a cadeia principal de modo a dar o menor número possível à insaturação (i.e. começa-se a numerar a partir da extremidade mais perto da insaturação).



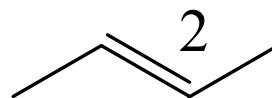
1-Buteno
But-1-eno



3-Etil-3-hexeno
3-Etil-hex-3-eno

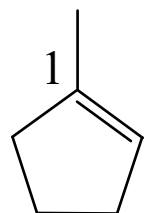


cis-But-2-eno

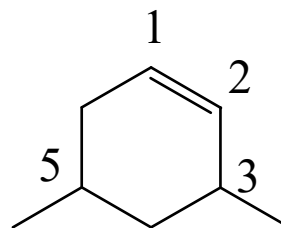


trans-But-2-eno

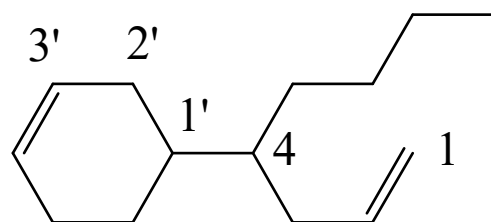
Nomenclatura de alcenos e alcinos



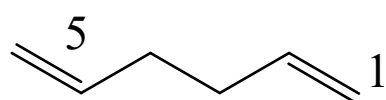
1-Metilciclopenteno
(não 2-Metilciclopenteno)



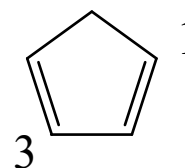
3,5-Dimetilciclo-hexeno
(não 4,6-Dimetilciclo-hexeno)



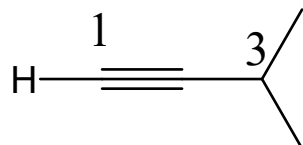
4-(Ciclohex-3-enil)-oct-1-eno



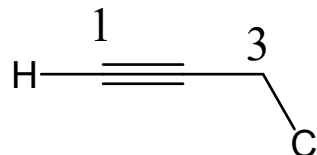
Hexa-1,5-dieno



Ciclopenta-1,3-dieno



3-Metilbutino
(não 2-Metilbut-3-ino)



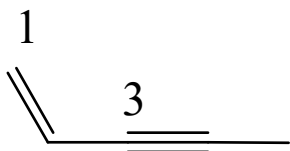
3-Cloropropino
3-Cloroprop-1-ino

Nomenclatura de alcenos e alcinos

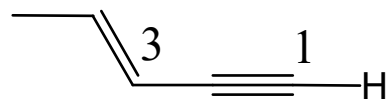
Compostos com ligações duplas e triplas são sempre alceninos (as ligações duplas são sempre referidas antes das triplas).

A numeração da cadeia começa-se do lado mais próximo da insaturação.

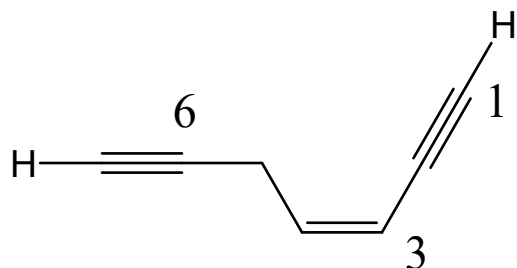
Em caso de igualdade numera-se de modo a dar o menor número à ligação dupla.



Pent-1-en-3-ino



Pent-3-en-1-ino



Hept-3-eno-1,6-diino

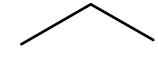
Grupos funcionais

R-X

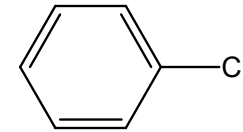
(R=Alquilo,Arilo)

X= halogénio

Halo-alcanos (R=Alquilo)

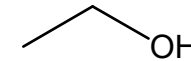


Halo-arenos (R=Arilo)

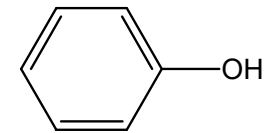


X= OH

Álcoois (alifáticos, R=Alquilo)

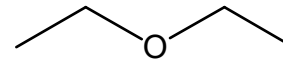


Fenóis (ou A.aromáticos, R=Arilo)



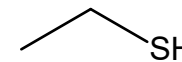
X= OR

Éteres



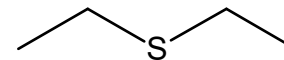
X= SH

Tióis



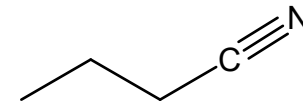
X= SR

Tioéteres

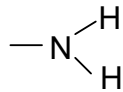


X= CN

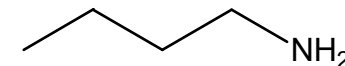
Nitrilo



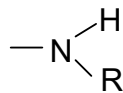
X=



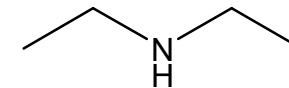
Aminas primárias
(N tem 1 C ligado)



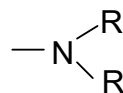
X=



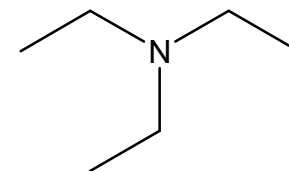
Aminas secundárias
(N tem 2 Cs ligados)



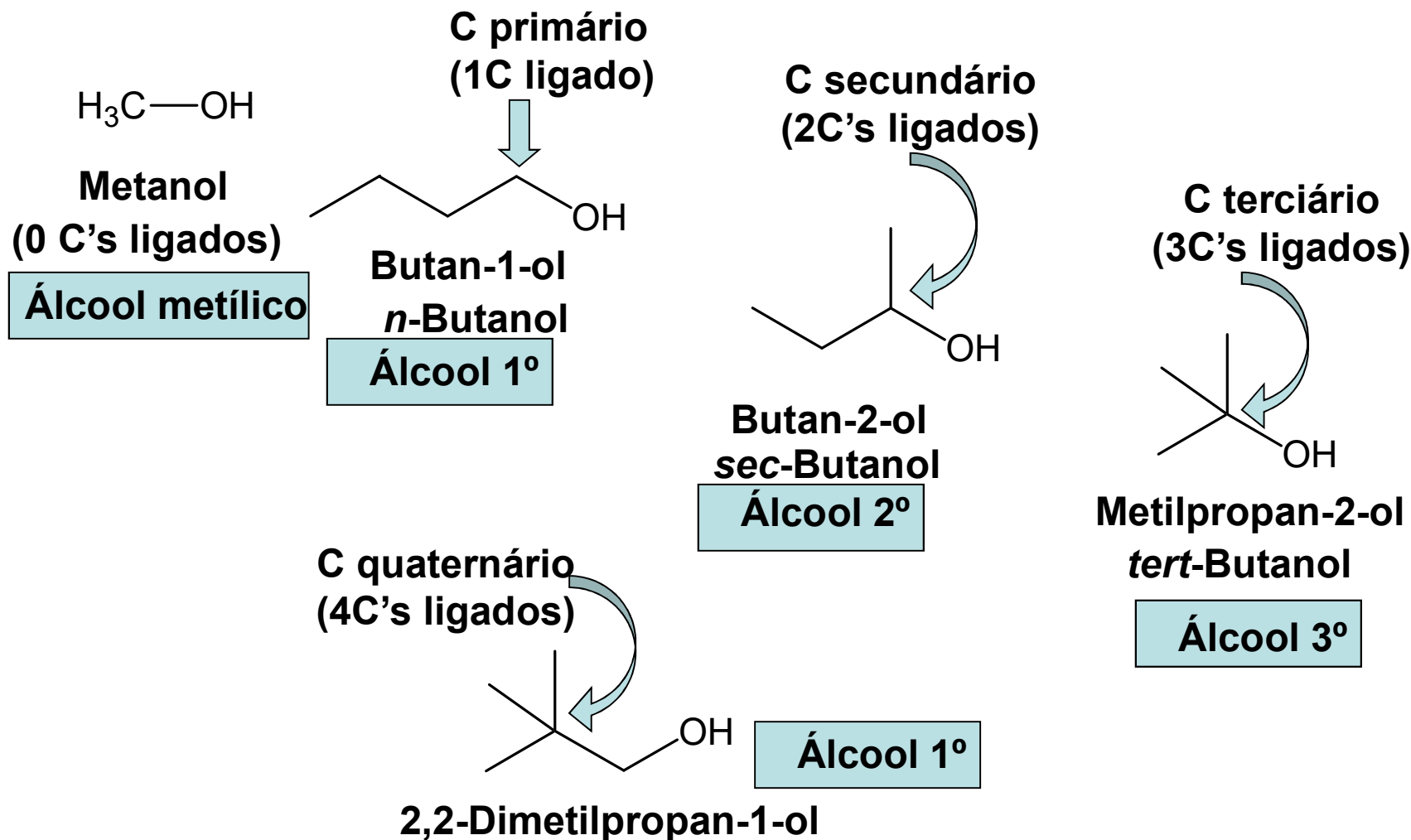
X=



Aminas terciárias
(N tem 3 Cs ligados)

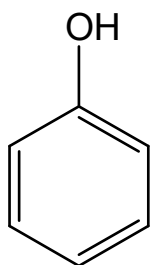


Classificação de átomos de C (metílico, 1°, 2°, 3° e 4°)

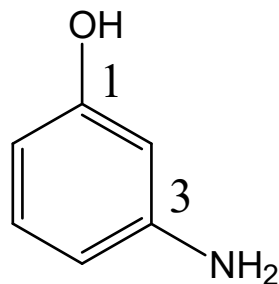


NOTA: classificação análoga à dos álcoois é utilizada para os halogenetos de alquilo (ex: $\text{CH}_3\text{CH}_2\text{Br}$ é um halogeneto de alquilo 1°)

Nomenclatura de álcoois aromáticos

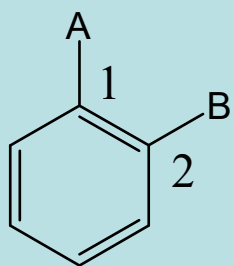


Fenol

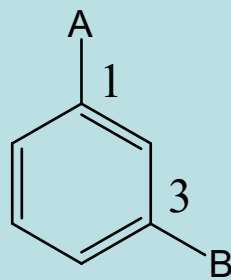


3-Aminofenol
meta-Aminofenol

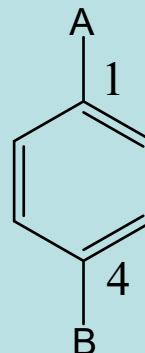
Substituição em anéis aromáticos



orto- OU 1,2

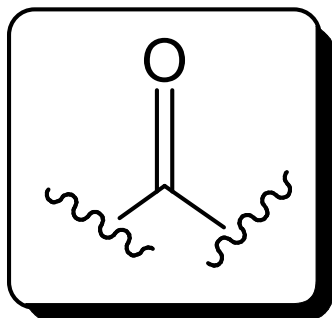


meta- OU 1,3

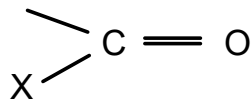


para- OU 1,4

Grupos funcionais contendo C=O (carbonilo)

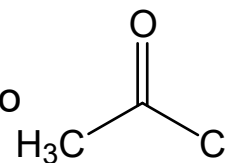


Grupo carbonilo



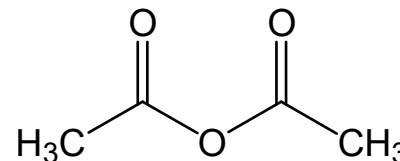
X= halogénio

Halogenetos de acilo



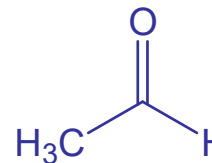
X= OCOR

Anidridos



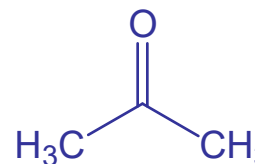
X= H

Aldeídos



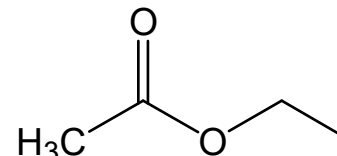
X= alquilo ou arilo

Cetonas



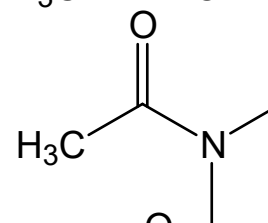
X= OR

Ésteres



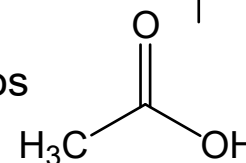
X= NR₂

Amidas



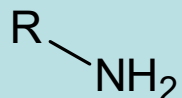
X= OH

Ácidos carboxílicos

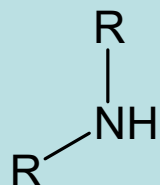


Aumento de reactividade

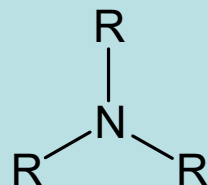
Classificação de aminas e amidas



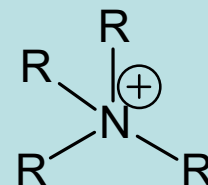
Amina 1^a
(1C ligado)



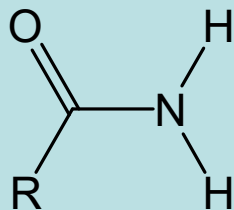
Amina 2^a
(2C's ligados)



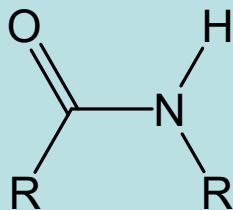
Amina 3^a
(3C's ligados)



Amina 4^a
(sal de amónio)
(4C's ligados)



Amida 1^a
(1C ligado)



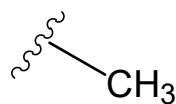
Amida 2^a
(2C's ligados)



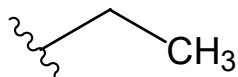
Amida 3^a
(3C's ligados)

Fragmentos comuns

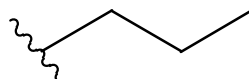
Me – metil(o)



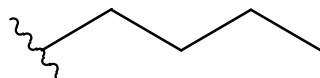
Et – etil(o)



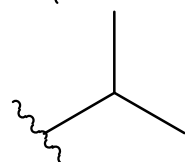
Pr (ou n-Pr) – propil(o)



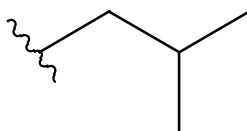
Bu (ou n-Bu) – butil(o)



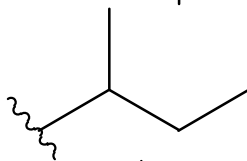
i-Pr – isopropil(o)



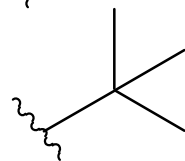
i-Bu – isobutil(o)



s-Bu – sec-butil(o)



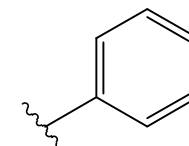
t-Bu – tert-butil(o)



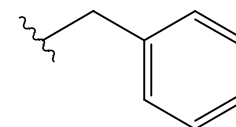
X – halogénio F, Cl, Br ou I

Ar – aril(o) Qualquer anel aromático

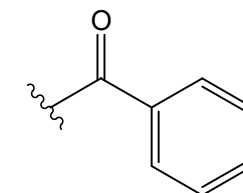
Ph – fenil(o)



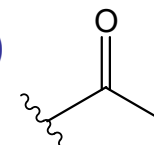
Bn – benzil(o)



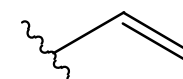
Bz – benzoil(o)



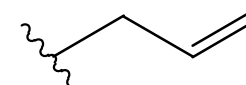
Ac – acetil(o)



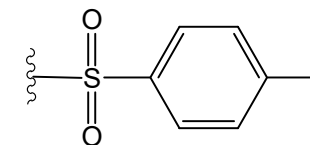
vinil(o)



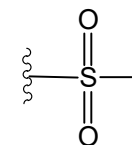
alil(o)



Ts – tosil(o)



Ms – mesil(o)



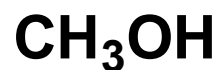
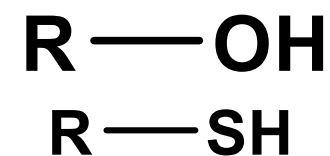
Nomenclatura em Química Orgânica

Grupos Funcionais

S. H. Pine, J. B. Hendrickson, D. J. Cram, G. S. Hammond, *Organic Chemistry*, McGraw-Hill. International Student Edition, 4th Ed., Tokyo, 1980, Cap. 2.

Alcoóis, fenóis e tióis

alcanol



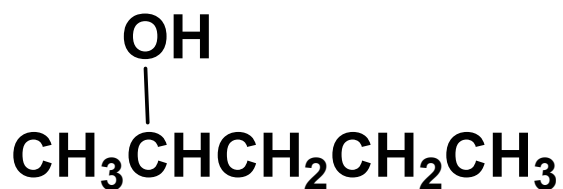
Metanol
(Alcool metílico)



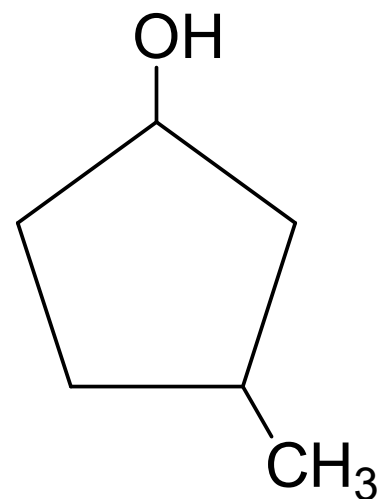
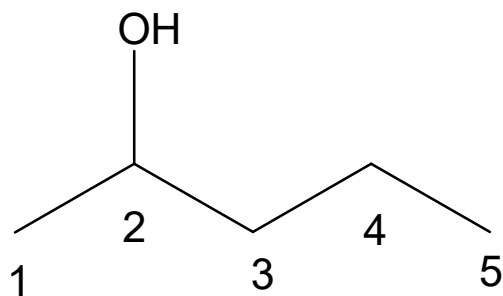
Etanol
(Alcool etílico)



Butan-1-ol

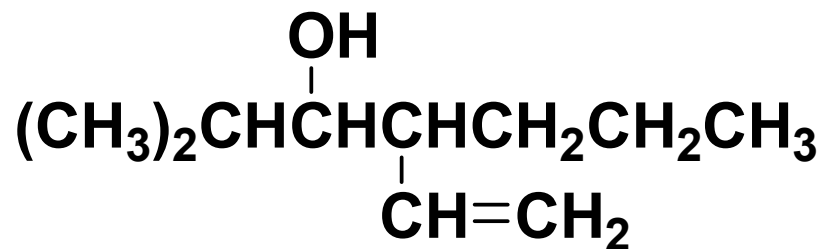


Pentan-2-ol



3-metilciclopentanol

Alcoóis, fenóis e tióis



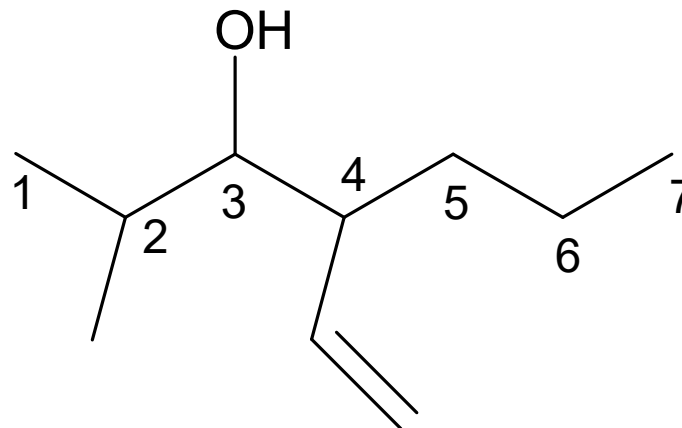
4-etenil-2-metil-heptan-3-ol

ou

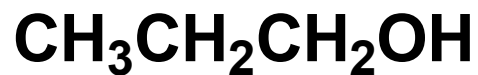
2-metil-4-vinil-heptan-3-ol



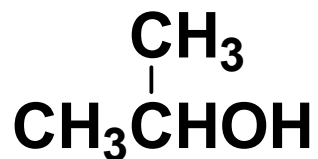
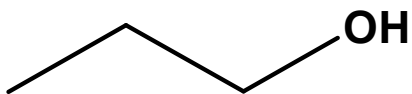
Prop-2-en-1-ol



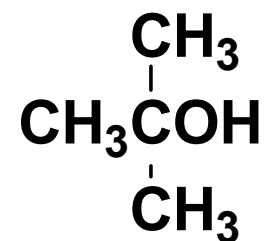
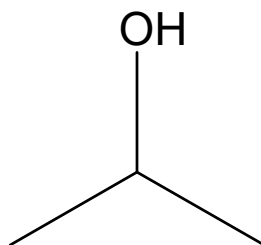
Alcoóis, fenóis e tióis



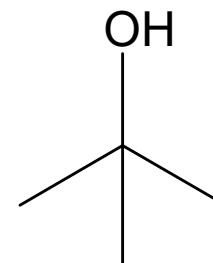
Propan-1-ol
Alcool primário



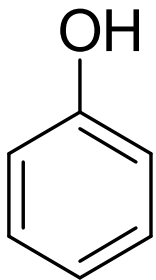
Propan-2-ol
Alcool isopropílico
Alcool secundário



2-metilpropan-2-ol
Alcool *ter*-butílico
Alcool terciário

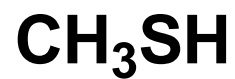


Alcoóis, fenóis e tióis



Fenol

Hidroxibenzeno



Metanotiol



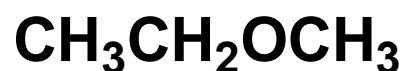
Etanotiol

Éteres e tioéteres (sulfuretos)



Alcóxialcano

Éter alquil-alquílico



Etóxietano

Éter dietílico

Metóxietano

Éter etílico metílico

2-metóxipropano

Éter isopropílico metílico



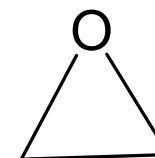
Etóxiciclopropano

Éter ciclopropílico etílico



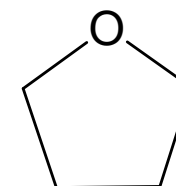
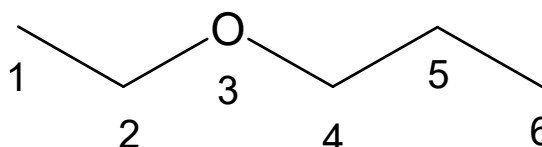
Etóxipropano

Éter etílico propílico
3-oxahexano



Oxaciclopropano

(óxido de etileno)



Oxaciclopentano

tetrahidrofurano, THF

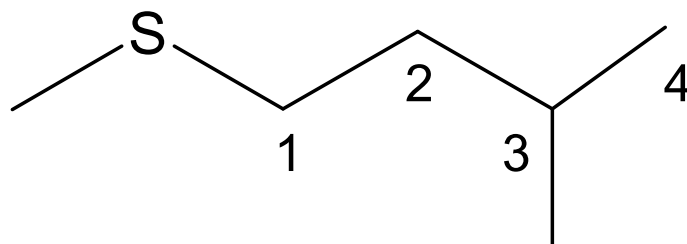
Éteres e tioéteres (sulfuretos)



Sulfureto dimetílico
metiltiometano



Sulfureto etílico metílico
metiltioetano

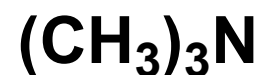
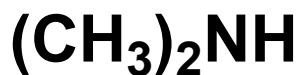
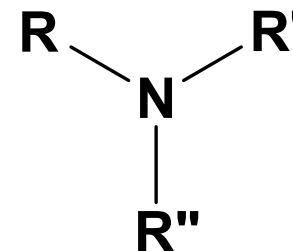


3-metil-1-(metiltio)butano

Aminas

Alcanamina

alquilamina



Metanamina

metilamina

Amina primária

***N*-metilmetanamina**

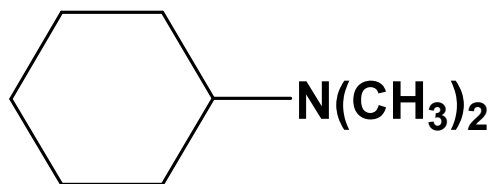
dimetilamina

Amina secundária

***N,N*-dimetilmetanamina**

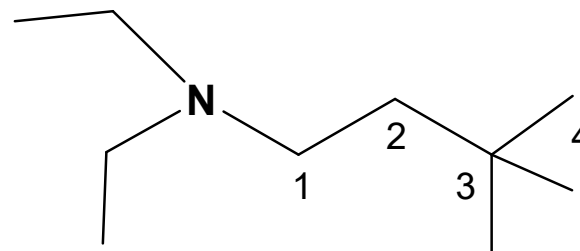
trimetilamina

Amina terciária



***N,N*-dimetilciclohexanamina**

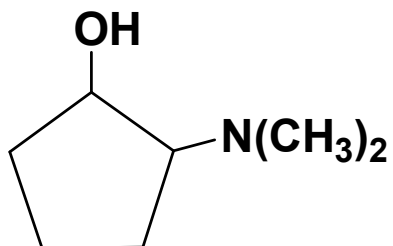
dimetilciclohexilamina



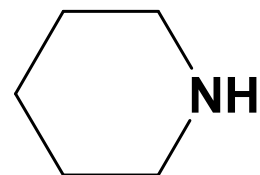
***N,N*-dietil-3,3-dimetilbutanamina**

dietil-3,3-dimetilbutilamina

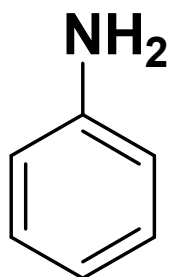
Aminas



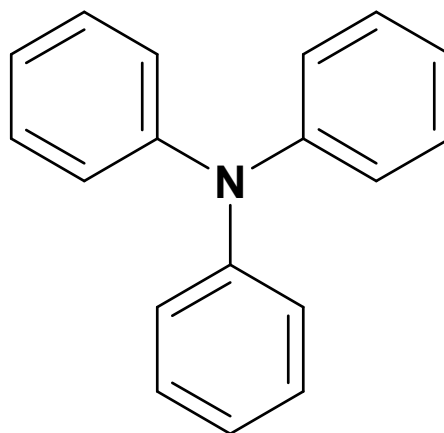
2-(*N,N*-dimetilamino)ciclopentanol



azaciclohexano



Anilina
benzenamina

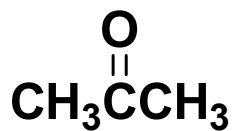
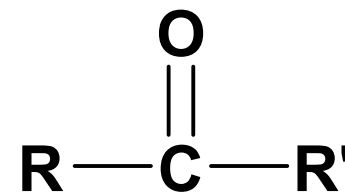


***N,N*-difenilanilina**
***N,N*-difenilbenzenamina**
trifenilamina

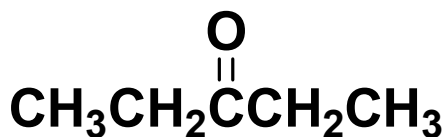
Cetonas

Alcanona

Alquil-alquil-cetona



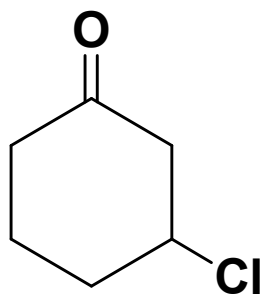
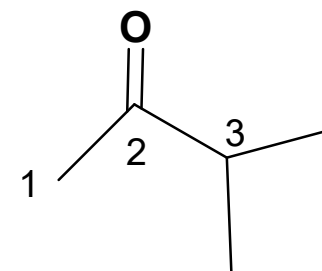
Acetona
propanona



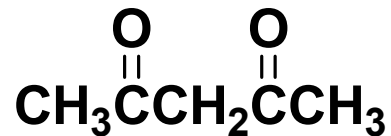
Pentan-3-ona
dietilcetona



3-metilbutan-2-ona
isopropilmetilcetona



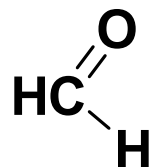
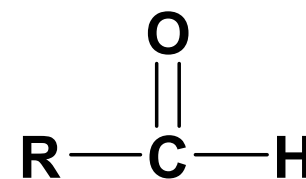
3-clorociclohexanona



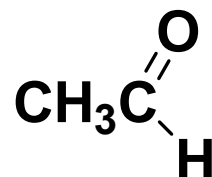
Penta-2,4-diona

Aldeídos (-CHO)

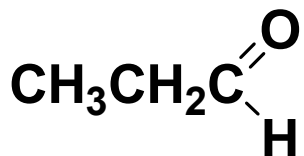
Alcanal



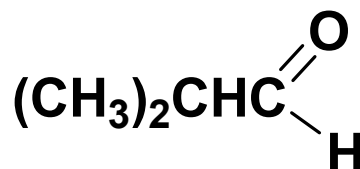
Formaldeído
metanal



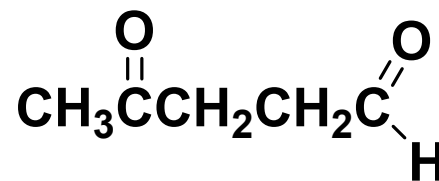
Acetaldeído
etanal



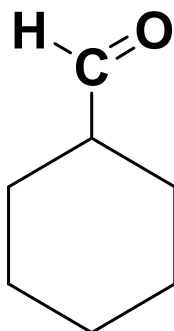
propanal



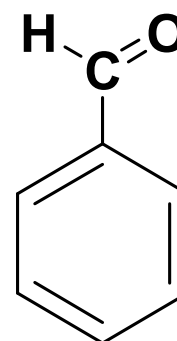
2-metilpropanal



4-oxopentanal



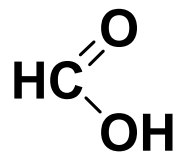
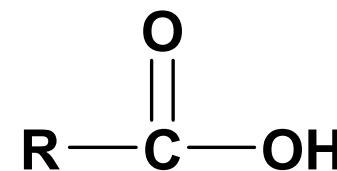
ciclohexanocarbaldeído



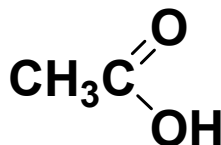
benzaldeído
benzenocarbaldeído

Ácidos carboxílicos (-COOH)

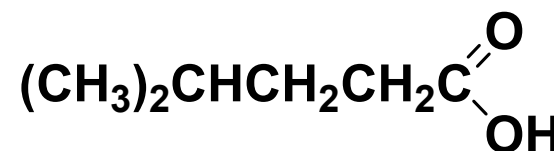
Ácido alcanóico



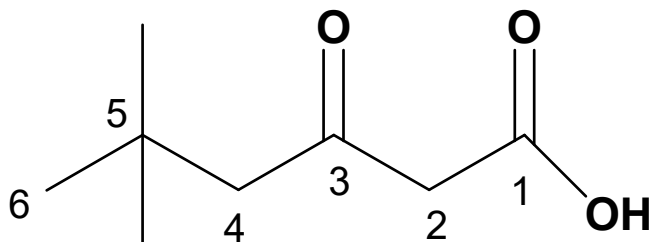
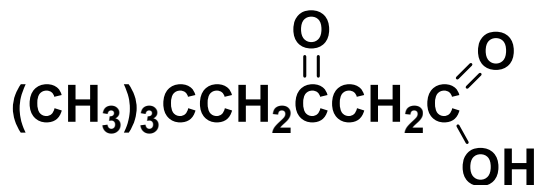
Ácido fórmico
Ácido metanóico



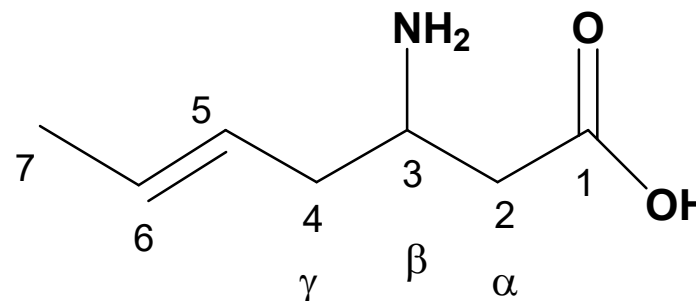
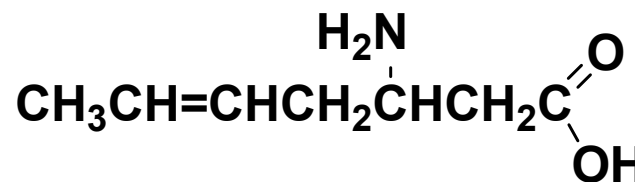
Ácido acético
Ácido etanóico



Ácido 4-metilpentanóico

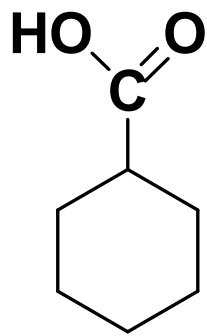


Ácido 5,5-dimetil-3-oxohexanóico

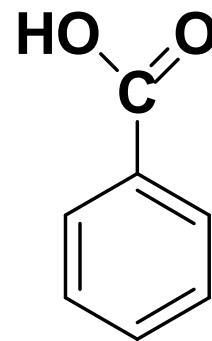


Ácido 3-aminohept-5-enóico

Ácidos carboxílicos (-COOH)

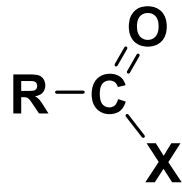


Ácido ciclohexanocarboxílico

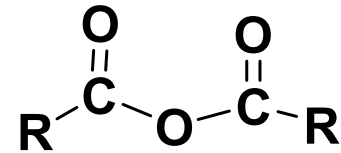


Ácido benzóico
Ácido benzenocarboxílico

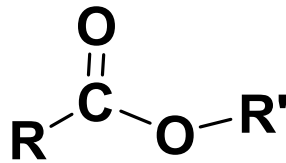
Derivados de Ácidos carboxílicos



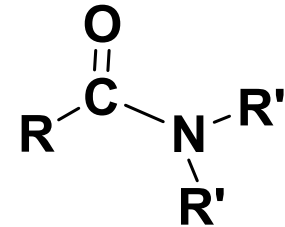
Halogenetos de acilo
Halogeneto de alcanóilo



Anidridos
Anidrido alcanóico alcanóico



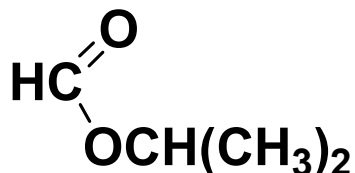
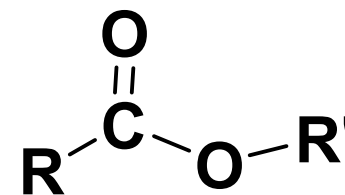
Ésteres
Alcanoato de alquilo



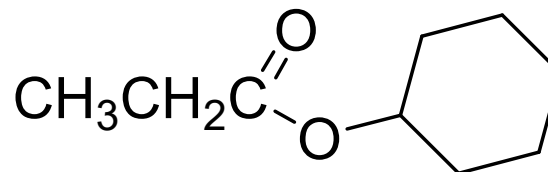
Amidas
Alcanamida

Ésteres (-COOR)

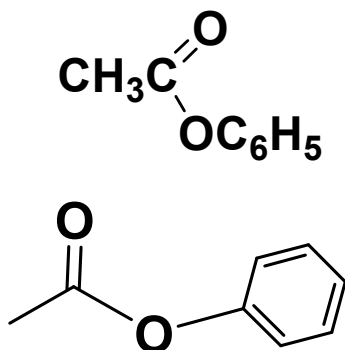
Alcanoato de alquilo



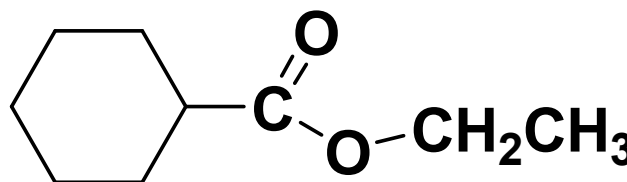
Formato de isopropilo
Metanoato de metiletilo



Propanoato de ciclohexilo



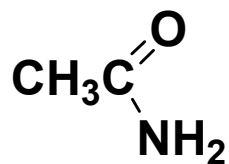
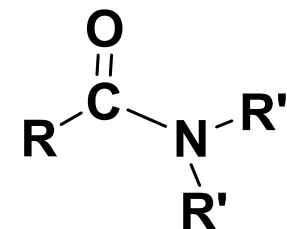
Acetato de fenilo
Etanoato de fenilo



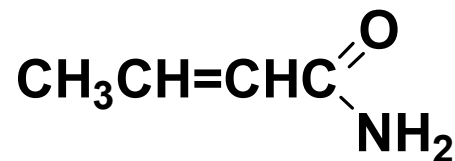
Ciclohexanocarboxilato de etilo

Amidas (-CONRR')

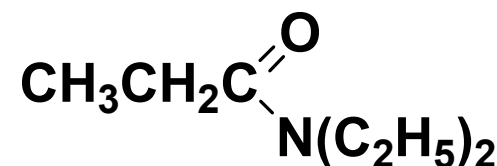
Alcanamida



Acetamida
Etanamida



But-2-enamida



N,N-diethylpropanamida