



NOMENCLATURA DE COMPUESTOS ORGÁNICOS

UNIDAD 1

QUÍMICA ORGÁNICA
2025

CONTENIDOS

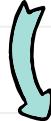
Aprenderemos cómo nombrar los siguientes compuestos orgánicos:

- *Alcanos, alquenos y alquinos.*
- *Hidrocarburos alicíclicos.*
- *Hidrocarburos aromáticos.*
- *Haluros de alquilo.*
- *Alcoholes.*
- *Éteres.*
- *Aldehídos y cetonas.*
- *Ácidos carboxílicos, ésteres y amidas.*
- *Aminas.*

HIDROCARBUROS

ALCANOS

01



Hidrocarburos
saturados.

02



Se encuentran
principalmente
en el **gas natural**
y el **petróleo**

03



$C_n H_{2n+2}$

ALCANOS NO RAMIFICADOS O ALCANOS NORMALES

Nombre: Prefijo que indica el n° de carbonos + ano

Hepta + ano



Heptano



Metano



Etano



Propano



Butano



Pentano



Hexano



Heptano



Octano



Nonano



Decano



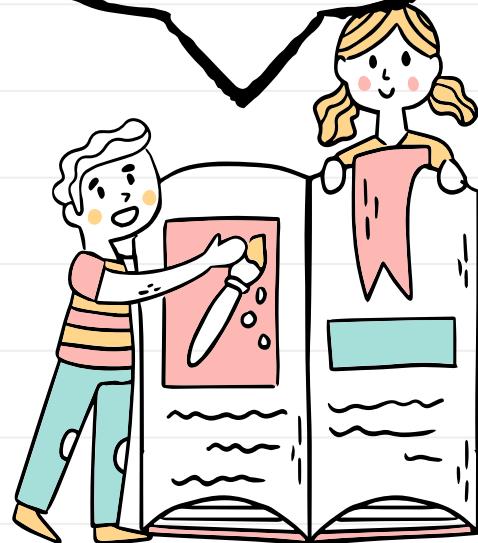
Undecano



Dodecano

APRENDIENDO A ESCRIBIR FÓRMULAS

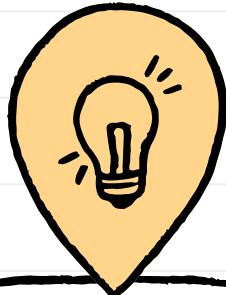
¿Cómo se puede escribir butano?



- Mediante su **fórmula molecular**: C_4H_{10}
- Mediante su **fórmula estructural desarrollada**:
$$\begin{array}{c} \text{H} & \text{H} & \text{H} & \text{H} \\ | & | & | & | \\ \text{H} - \text{C} - \text{C} - \text{C} - \text{C} - \text{H} \\ | & | & | & | \\ \text{H} & \text{H} & \text{H} & \text{H} \end{array}$$
- Mediante su **fórmula estructural condensada**:
 $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$
- Mediante su **fórmula estructural de esqueleto**:

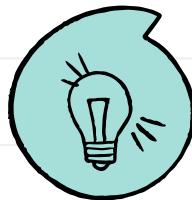


GRUPOS ALQUILO



Eliminando un átomo de hidrógeno en un hidrocarburo saturado se obtiene un:

**GRUPO ALQUILO
O RADICAL ALQUILO**



CONSTRUCCIÓN DEL NOMBRE

Alcano de igual número de átomos de carbono

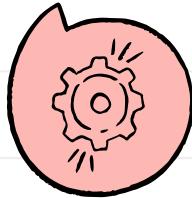


Terminación de la nomenclatura

-ANO → -ILO → -IL

BUTANO → BUTILO → BUTIL

Nombre del grupo alquilo



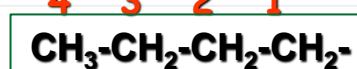
NUMERACIÓN

Se comienza a numerar por el carbono que presenta la valencia libre



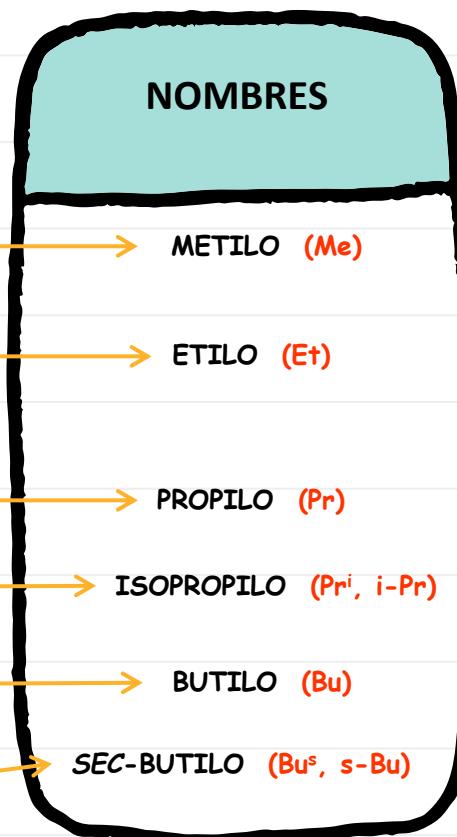
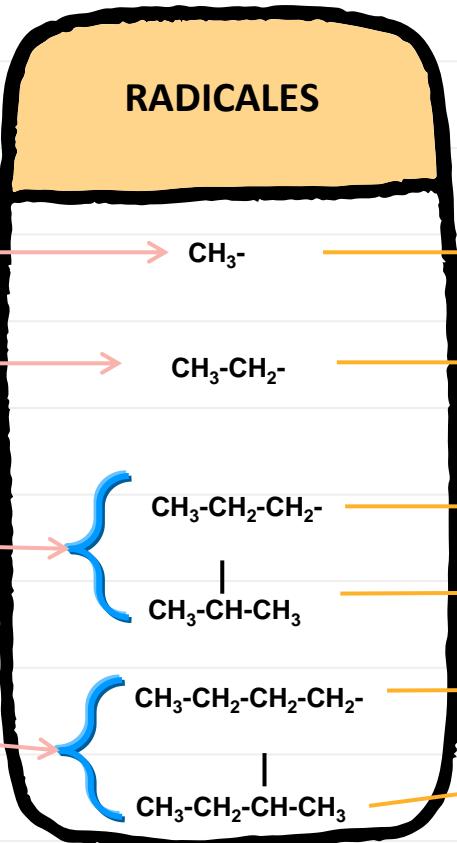
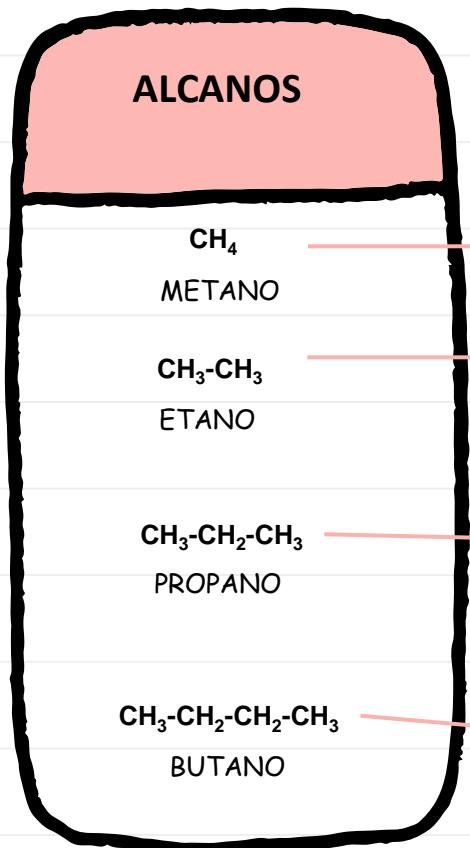
4 3 2 1

Nombre como sustituyente



R-

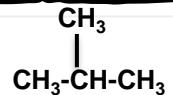
NOMBRE DE LOS GRUPOS ALQUILOS SENCILLOS



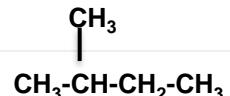
NOMBRES PROPIOS DE ALCANOS RAMIFICADOS Y SUS RADICALES



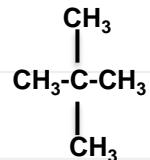
ALCANOS RAMIFICADOS



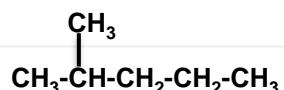
ISOBUTANO



ISOPENTANO

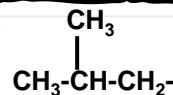


NEOPENTANO

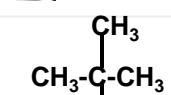


ISOHEXANO

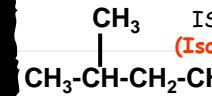
RADICALES RAMIFICADOS



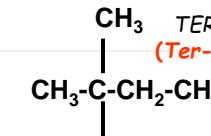
ISOBUTILO
(Bu[†], i-Bu)



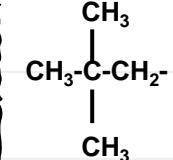
TER-BUTILO
(Bu[†], t-Bu)



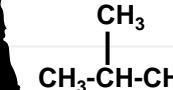
ISOPENTILO
(Isoamilo, i-Am)



TER-PENTILO
(Ter-amilo, t-Am)



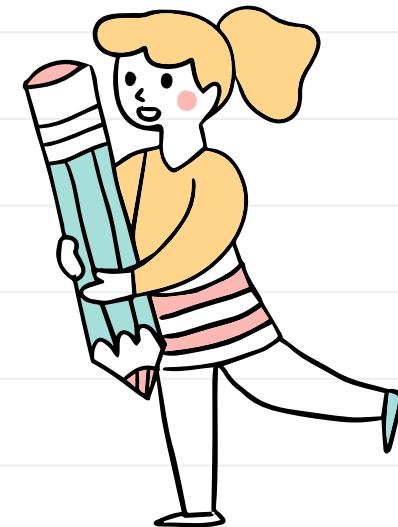
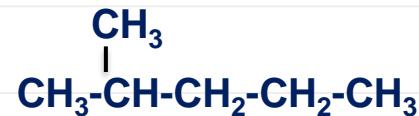
NEOPENTILO



ISOHEXILO

NOMENCLATURA IUPAC DE LOS COMPUESTOS DEL CARBONO

ALCANOS RAMIFICADOS

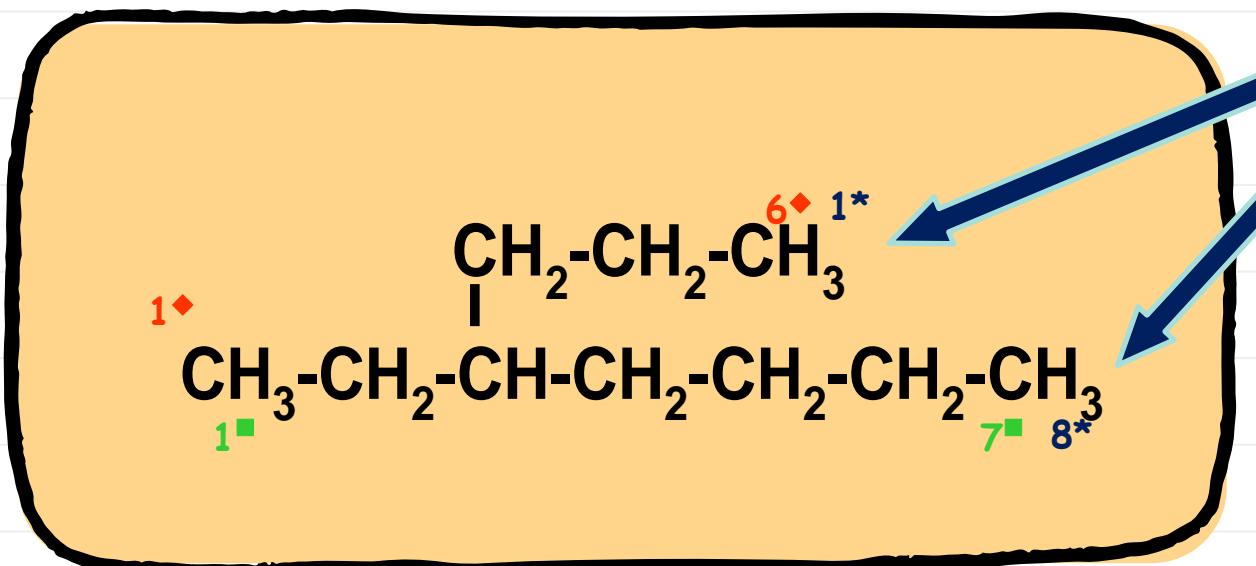


- **Nombre base:** el de la **cadena principal** que es la cadena de átomos de carbono continua más larga.
- **Sustituyentes:** **grupos unidos a la cadena principal.**
Cada sustituyente se localiza por su nombre y por el número del átomo de carbono al cual está unido.



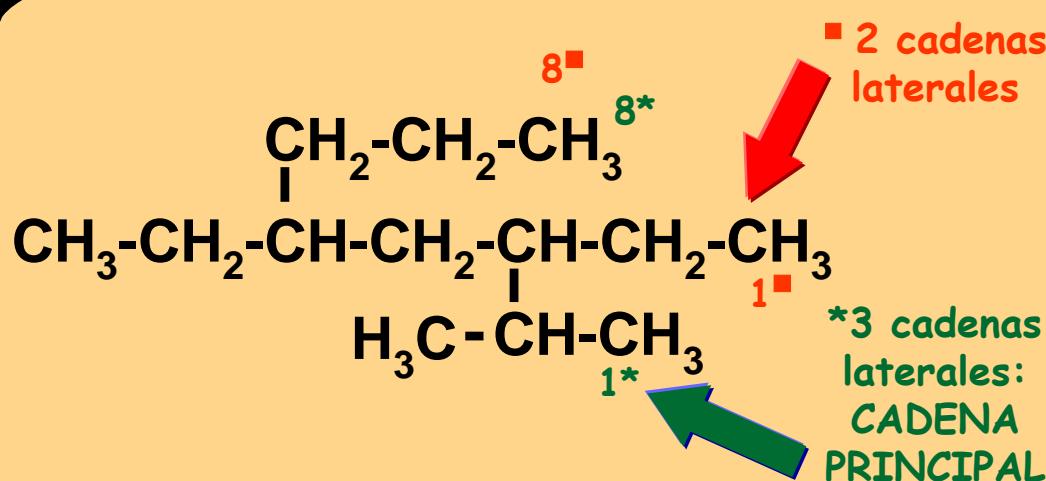
1. Elección de la cadena principal

1.1. Se elige la cadena de mayor número de átomos de carbono





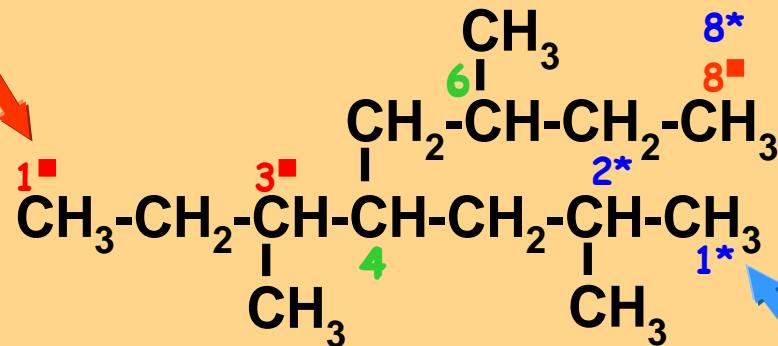
1.2. Aquella de mayor número de cadenas laterales





1.3. Aquella de cadenas laterales con localizador más bajo

- 8 carbonos
- 3 ramificaciones en 3, 4 y 6



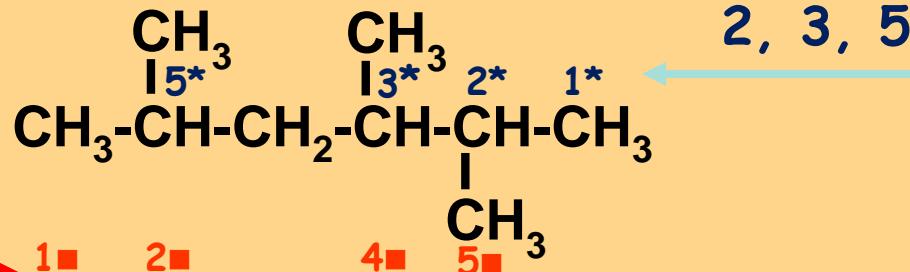
*8 carbonos
3 ramificaciones en 2, 4 y 6
CADENA PRINCIPAL



2. La Numeración

2.1. Números más bajos a los sustituyentes

*NUMERACIÓN
CORRECTA



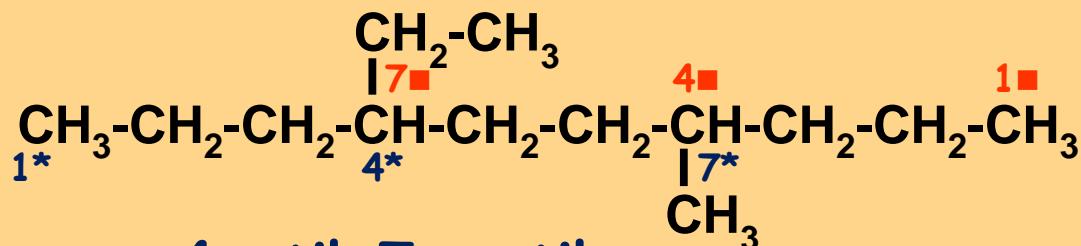
■ Numeración
incorrecta



2.2 Números más bajos a los sustituyentes por orden alfabético

■ Numeración incorrecta

4-metil-7-ethyl



4-ethyl-7-metil

*E antes que M
NUMERACIÓN CORRECTA

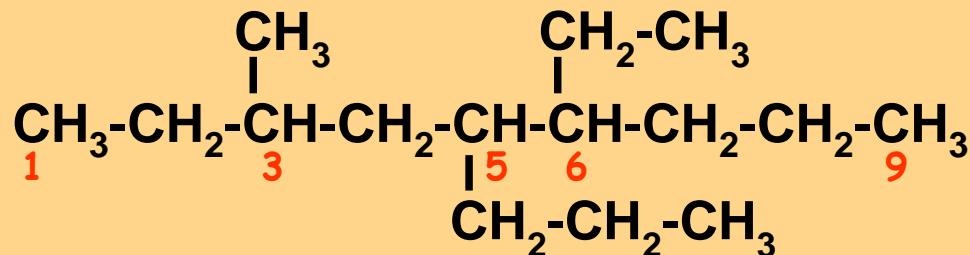


3. El nombre

Localizadores-Sustituyentes
(cadenas laterales)

+ Nombre Alcano
(cadena principal)

3.1. Se anteponen los nombres de los sustituyentes por orden alfabético acompañados de su localizador

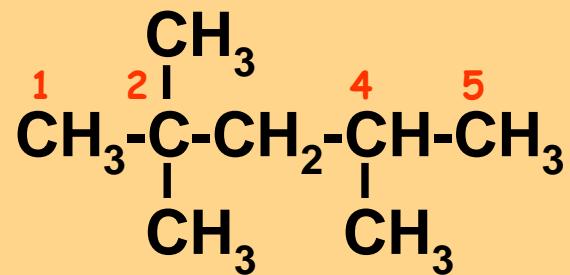


6-Etil-3-metil-5-propilnonano





3.2. Sustituyentes repetidos en el mismo y/u otro carbono repiten el número y utilizan prefijos multiplicativos (di, tri, tetra, etc)



2,2,4-Trimetilpentano

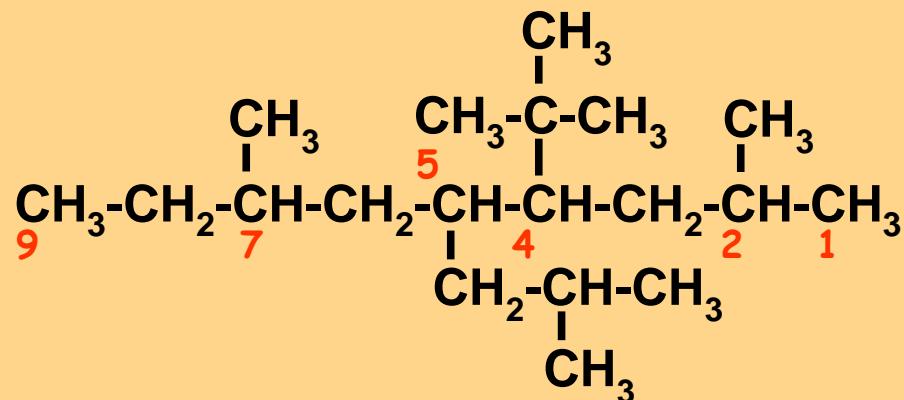




3.3. Los prefijos multiplicativos (di-, tri-, tetra, etc) no se alfabetizan

3.4. Los prefijos **n-**, **sec-**, **ter-** no se alfabetizan

3.5. Los prefijos iso, neo y ciclo si se alfabetizan y se escriben sin guión



4-ter-Butil-5-isobutil-2,7-dimetilnonano



ALQUENOS

- Para designar un *doble enlace* $C=C$, se usa la terminación **eno**
- Dieno, trieno**, etc para más de un doble enlace.

ALQUINOS

- Para un *triple enlace* se utiliza la terminación **ino**
- Diino** para dos triples enlaces.

PASOS PARA LA NOMENCLATURA:

01

Se debe *seleccionar la cadena más larga* que incluya **ambos** carbonos del doble o triple enlace.

02

Numerar la cadena a partir del extremo más cercano al enlace múltiple. (Los átomos de C de dicho enlace deben tener los números más pequeños posibles)

03

Si el enlace múltiple es equidistante a ambos extremos de la cadena, la *numeración empieza a partir del extremo más cercano a la 1^o ramificación*

04

Indicar la posición del enlace múltiple mediante el *número* del **primer** carbono de dicho enlace.

EJEMPLOS

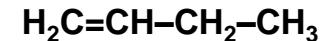
Eteno (etileno)



Propeno (propileno)



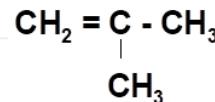
1-buteno



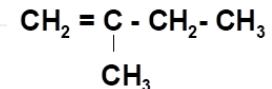
2-buteno



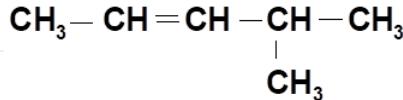
Metilpropeno (Isobutileno)



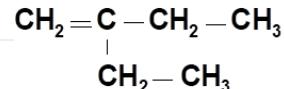
2-metil-1-buteno



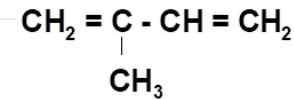
4-metil-2-penteno



2-etil-1-buteno



2-metil-1,3-butadieno



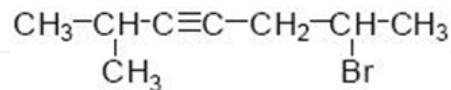
acetileno



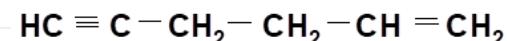
2-butino



6-bromo-2-metil-3-heptino



1-hexen-5-ino



HIDROCARBUROS ALIFÁTICOS CÍCLICOS

01



CICLOALCANOS

02

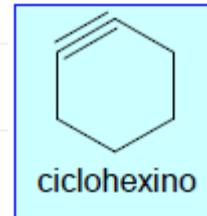


CICLOALQUENOS

03

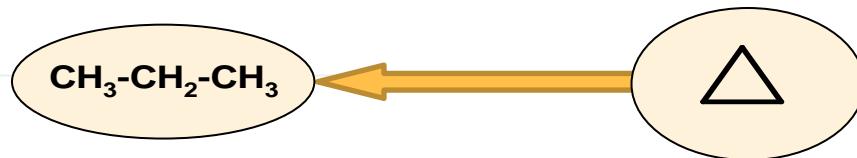


CICLOALQUINOS

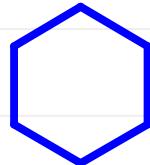


1.1. Se antepone el prefijo **ciclo-** al nombre del alcano de igual número de carbonos

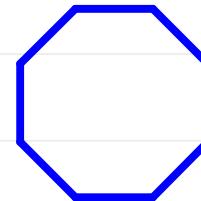
Cicloalcano



Propano Ciclopropano

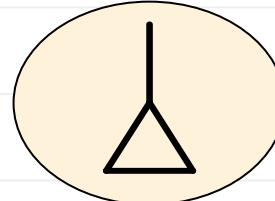
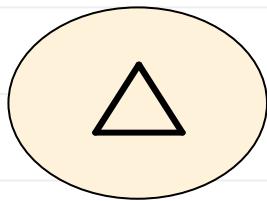


Ciclohexano



Ciclooctano

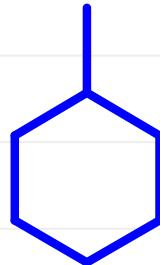
1.2. Los radicales se nombran cambiando **-ano** por **-ilo**



Ciclopropano

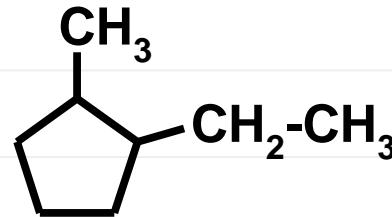


Ciclopropilo

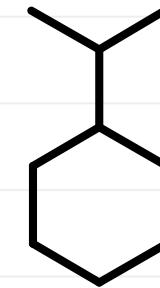


Ciclohexilo

1.3. Cicloalcanos sustituidos: Se utilizan las mismas reglas que para alkanos. Cuando sólo hay un sustituyente, **no** se precisa localizador.

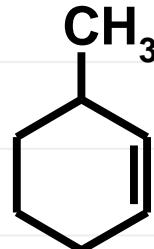


1-Etil-2-metilciclopentano

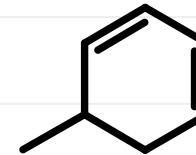


Isopropilciclohexano

1.4. Cicloalquenos y cicloalquinos: Se utilizan las mismas reglas que para alquenos y alquinos.



3-Metilciclohexeno

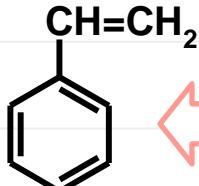


5-Metil-1,3-ciclohexadieno

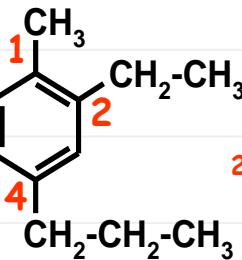
HIDROCARBUROS AROMÁTICOS

Nombre: localizadores + sustituyentes + benceno

MONOSUSTITUIDOS



No necesita
localizador
6 carbonos
equivalentes



2-Etil-1-metil-4-propilbenceno

Numeración: Se dan los nº más bajos a los sustituyentes

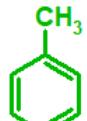
NOMBRES PROPIOS Y SUS RADICALES

Ar-

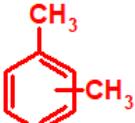
BENCENO Y SUS DERIVADOS



BENCENO



TOLUENO



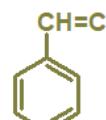
o-XILENO

m-XILENO

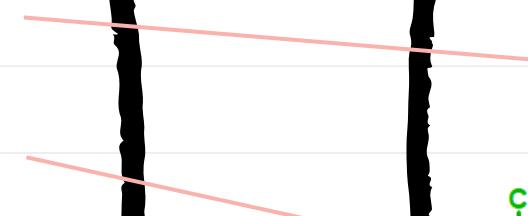
p-XILENO



MESITILENO



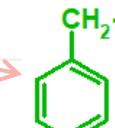
ESTIRENO



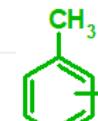
RADICALES ARILO



FENILO
(Ph-)



BENCILO



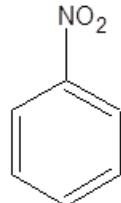
o-TOLILO
m-TOLILO
p-TOLILO

Disustituidos

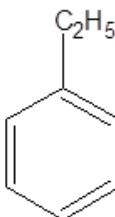
ortho- \rightarrow *o*- \rightarrow 1,2-
meta- \rightarrow *m*- \rightarrow 1,3-
para- \rightarrow *p*- \rightarrow 1,4-

EJEMPLOS

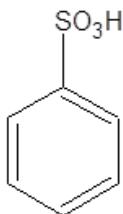
Nitrobenceno



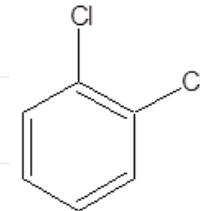
Etilbenceno



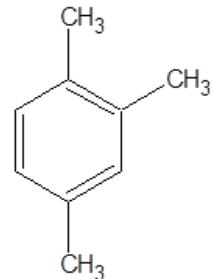
Ácido bencenosulfónico



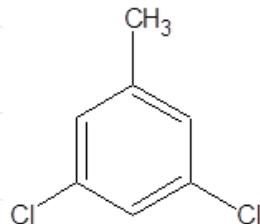
o-diclorobenceno



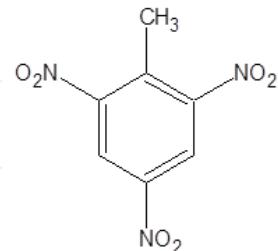
1,2,4-trimetilbenceno



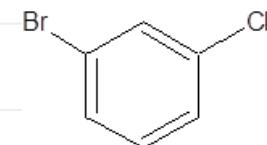
3,5-diclorotolueno



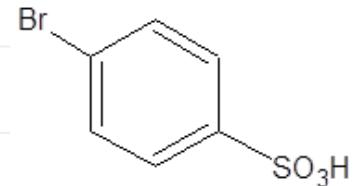
2,4,6-trinitrotolueno (TNT)

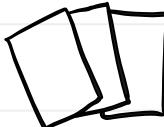


m-bromoclorobenceno



Ác. p-bromobencenosulfónico

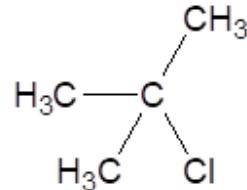




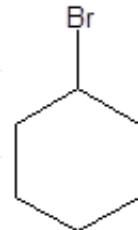
HALOGENUROS DE ALQUILO Y ARILO

R-X

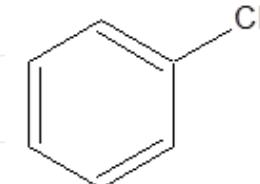
Ar-X



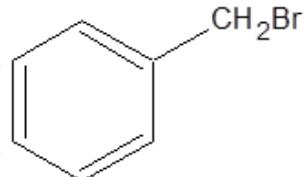
2-cloro-2-metilpropano
Cloruro de t-butilo



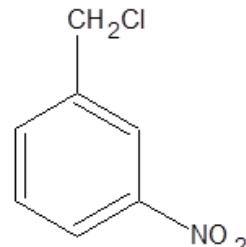
Bromociclohexano
Bromuro de ciclohexilo



Clorobenceno



Bromuro de bencilo

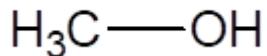


Cloruro de m-nitrobencilo

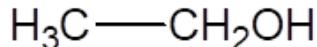


ALCOHOLES

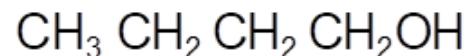
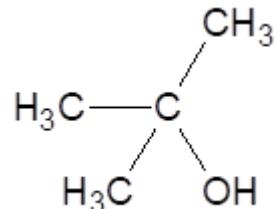
R-OH



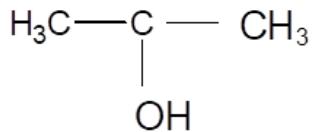
Metanol
Alcohol metílico



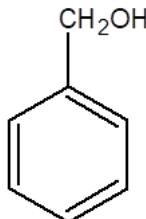
Etanol
Alcohol etílico



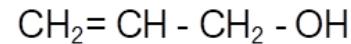
1-butanol
Alcohol n-butílico



2-propanol
Alcohol isopropílico



Alcohol bencílico



2-propen-1-ol

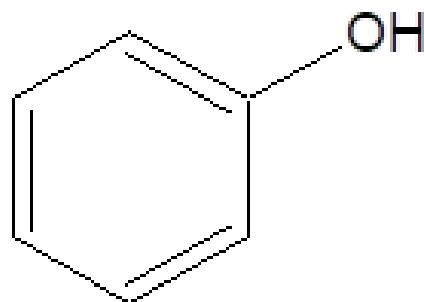


Ciclopentanol
Alcohol ciclopentílico

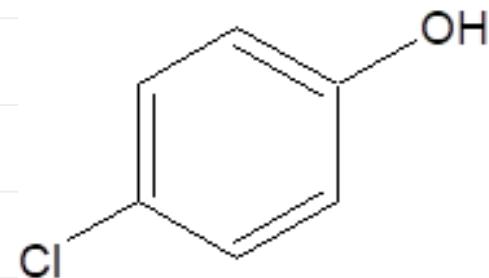


FENOLES

Ar-OH



FENOL

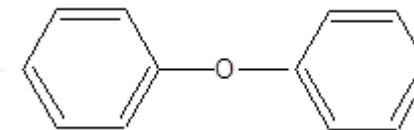
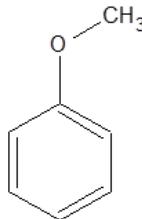
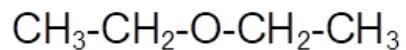


p-CLOROFENOL



ÉTERES

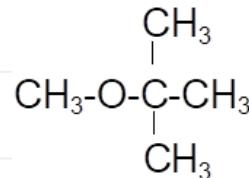
R-O-R'



Dietiléter
Éter etílico

Fenilmetiléter
Anisol

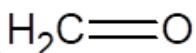
Difeniléter



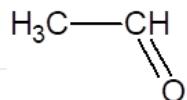
t-butilmetiléter

ALDEHÍDOS Y CETONAS

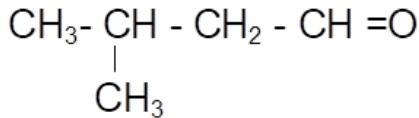
R-CHO



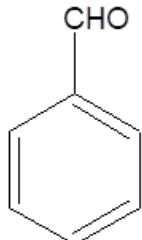
METANAL
(Formaldehído)



ETANAL
(Acetaldehído)

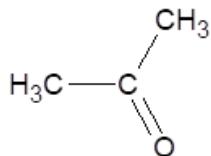


3-metilbutanal

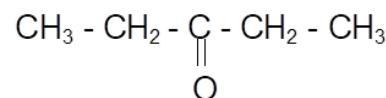


BENZALDEHÍDO

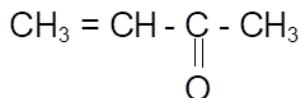
R-CO-R



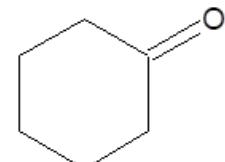
PROPANONA
(Acetona)



3-pantanona



3-buten-2-ona

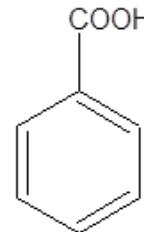
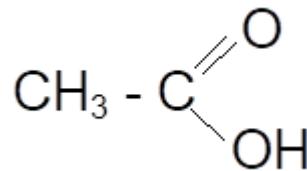
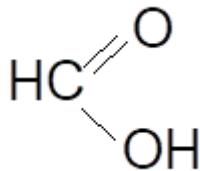


CICLOHEXANONA



ÁCIDOS CARBOXÍLICOS

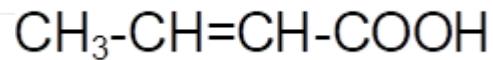
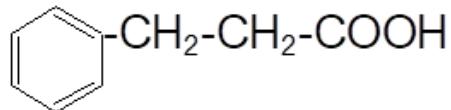
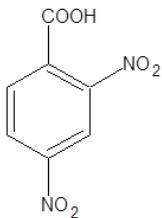
R-COOH



Ácido metanoico
(Ácido fórmico)

Ácido etanoico
(Ácido Acético)

Ácido benzoico



Ácido 2,4-dinitrobenzoico

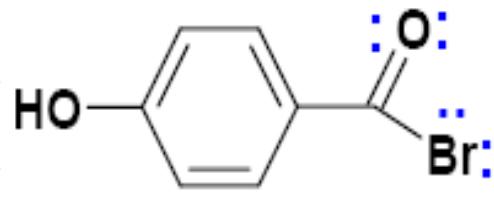
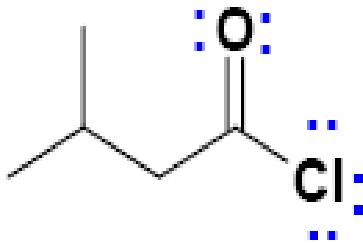
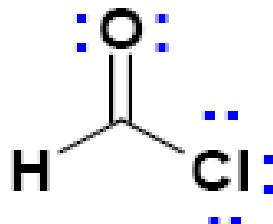
Ácido 3-fenilpropanoico

Ácido 2-butenoico



HALUROS DE ACILO

R-COX'



Cloruro de metanoílo
(Cloruro de formilo)

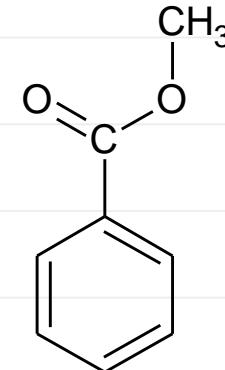
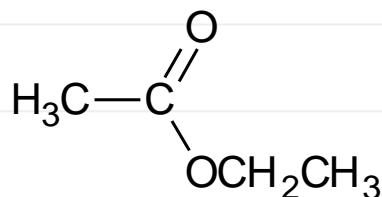
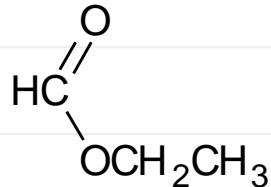
Cloruro de 3-metilbutanoílo
(Cloruro de isovaleroílo)

Bromuro de p-hidroxibenzoílo



ÉSTERES

R-COOR'



Metanoato de etilo
(Formiato de etilo)

Etanoato de etilo
(Acetato de etilo)

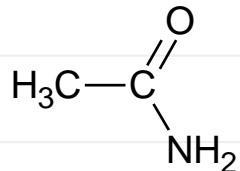
Benzoato de metilo



AMIDAS

PRIMARIAS

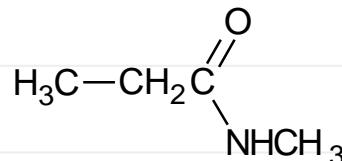
R-CONH₂



etanamida

SECUNDARIAS

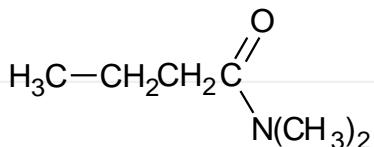
R-CONHR'



N-metilpropanamida

TERCIARIAS

R-CONR'R''



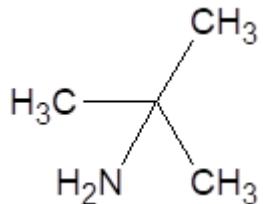
N,N-dimetilbutanamida



AMINAS

PRIMARIAS

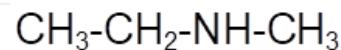
$R-NH_2$



t-butilamina

SECUNDARIAS

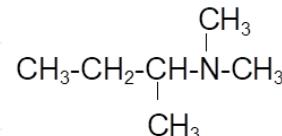
R_2-NH



etilmetilamina

TERCIARIAS

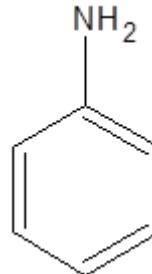
R_3-N



sec-butildimetilamina

AROMÁTICAS

$Ar-NH_2$



Anilina

MUCHAS GRACIAS!

