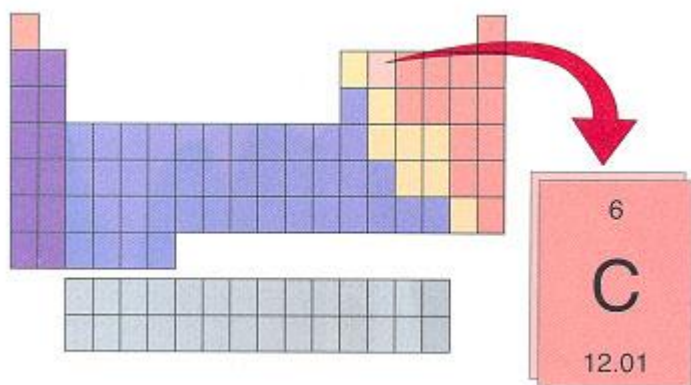


O que é a Química Orgânica?

A química orgânica é essencialmente a química dos compostos de carbono.



Se olharmos para a tabela periódica verificamos que tem 112 elementos. Há todo um ramo da química baseado essencialmente num desses elementos enquanto os compostos contendo apenas os restantes 111 são estudados numa outra área da química, a química inorgânica. Porquê?

Consequência de uma propriedade do carbono – os átomos de carbono podem ligar-se uns aos outros de forma a produzir um número sem limites de combinações diferentes.

O que é a Química Orgânica?

São conhecidos actualmente mais de 16 milhões de compostos orgânicos diferentes com as mais variadas formas, características e funções, enquanto que existem só cerca de 1,5 milhões de compostos inorgânicos conhecidos.

Outros elementos presentes:

Hidrogénio

Oxigénio

Azoto

Enxofre

Fósforo

Halogéneos (flúor, cloro, bromo e iodo)

**Memorizar a estrutura, propriedades e reactividades de cada um dos compostos
é
IMPOSSÍVEL**

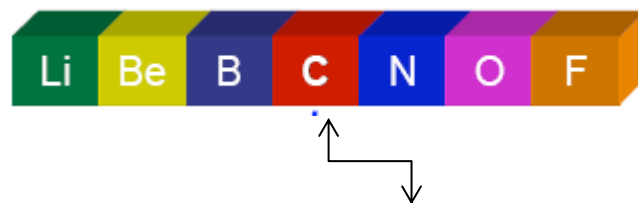
Química Orgânica

Racional e SISTEMÁTICA

Objectivo:

Conhecer ferramentas para compreender o que não nos é familiar

Centro da segunda linha da tabela periódica



Tanto dá como aceita e⁻

Partilha electrões com outros átomos de carbono

Química Orgânica

Todos os estados físicos



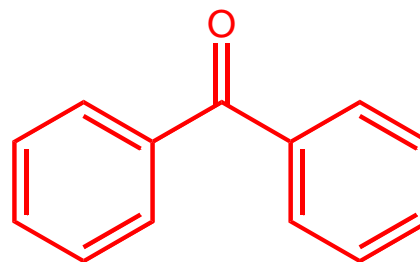
etano

gás



propanol

liquido

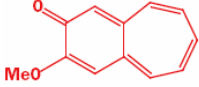
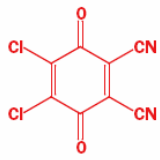

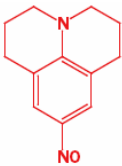
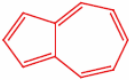



benzofenona

sólido

Química Orgânica

Todas as cores

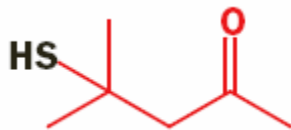
Cor	Descrição	Composto	Estrutura
vermelho	Placa hexagonais vermelhas escuras	3'-metoxibezocicloheptatrieno-2'-ona	
laranja	agulhas âmbar	Dicloro dicianoquinona	
amarelo	Gás tóxico e explosivo amarelo	diazometano	
verde	Prismas verdes com um brilho azulado	9-nitroso-jololidina	
azul	Líquido azul profundo com um cheiro apimentado	azuleno	
violeta	Líquido azul profundo que condensa como um sólido violeta	Nitroso trifluorometano	

Química Orgânica

Uma grande variedade de cheiros:



Propanoditiol



4-metil-4-sulfanilpentano-2-ona

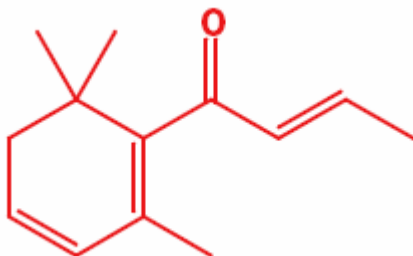
Candidatos a compostos mais malcheirosos do mundo



Cheiro produzido pelos texugos contém estes compostos



Responsável pelo cheiro das trufas negras

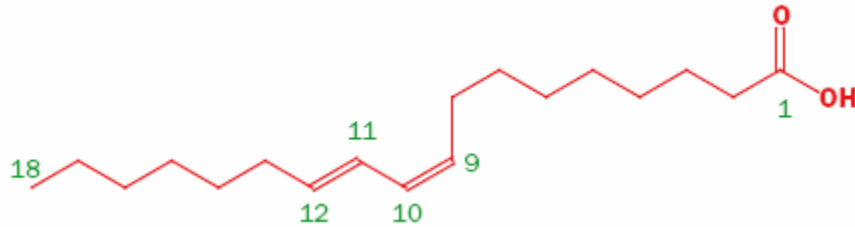


Responsável pelo cheiro das rosas

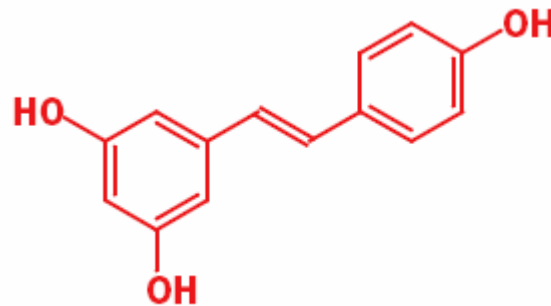
damascenona

Química Orgânica

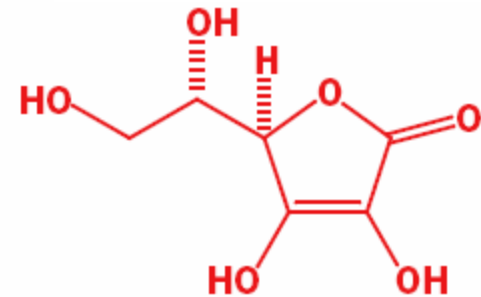
constituintes alimentares benéficos



Ácido linóleico (cis9, trans11) conjugado



resveratrol



Vitamina C

Química Orgânica

Plásticos e polímeros

Detergentes

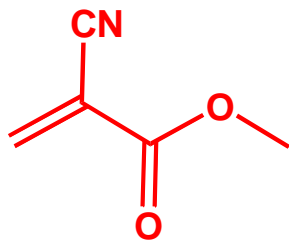
Colas e adesivos

Pigmentos e corantes

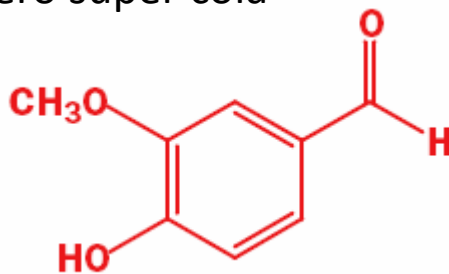
Aromas e fragâncias

Medicamentos

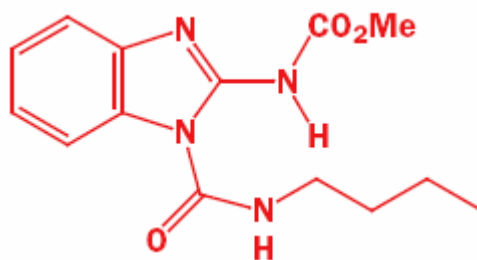
Pesticidas e fungicidas



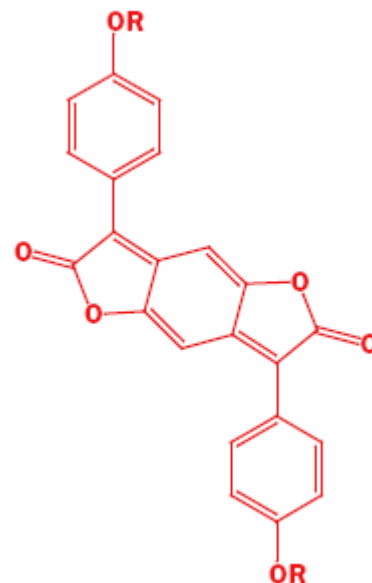
Monómero super cola



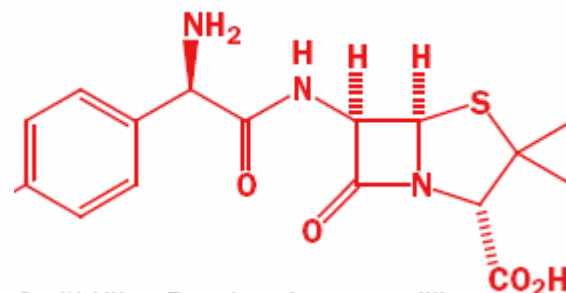
vanilina



benomil



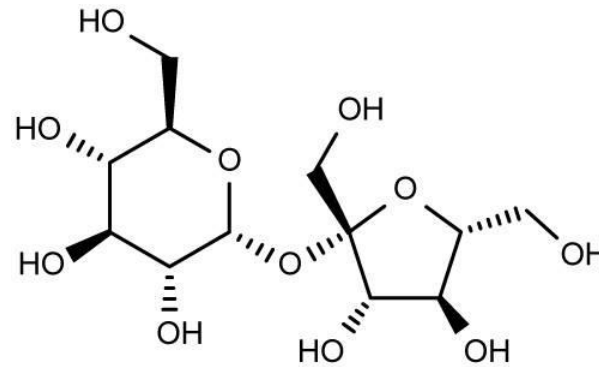
Corante vermelho para poliéster



Antibiótico amoxicilina

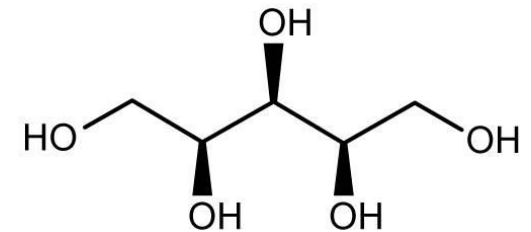
Química Orgânica

Sensação de doce

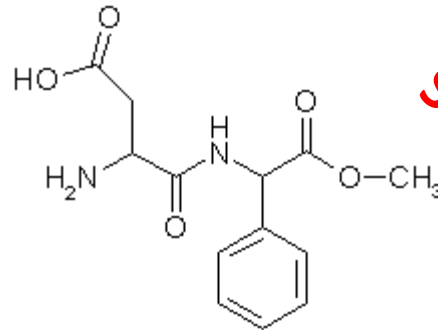


Sacarose

Naturais

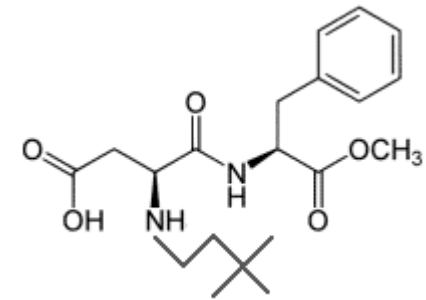


Xilitol (E967)



Aspartame (E951)

Sintéticos

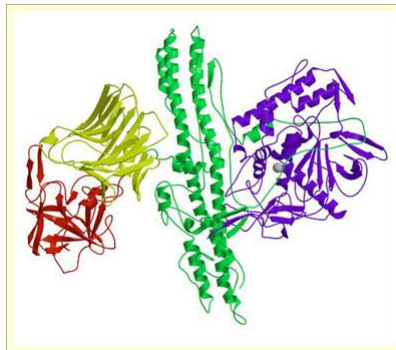


Neotame (E961)

Naturais ou sintéticos

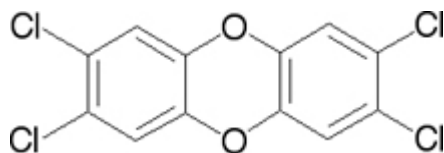
Química Orgânica

Venenos

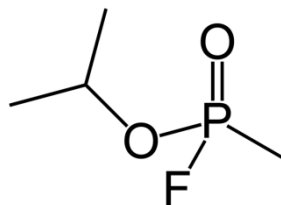


Naturais

Toxina do botulismo (proteína 150 kDA)
 $LD_{50} 3 \times 10^{-8}$ mg/kg

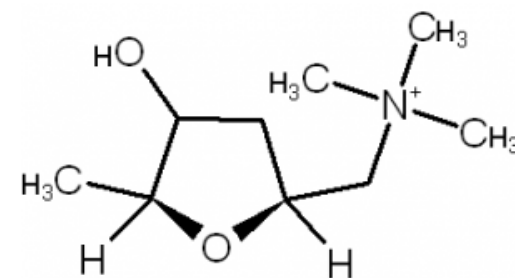


Dioxina de Seveso
 $LD_{50} 3 \times 10^{-2}$ mg/kg



Sintéticos

Sarin
 $LD_{50} 4 \times 10^{-1}$ mg/kg

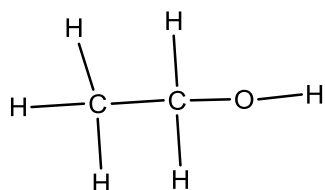


Muscarina
 $LD_{50} 2 \times 10^{-1}$ mg/kg

Naturais ou sintéticos

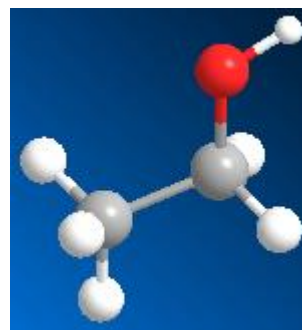
Química Orgânica

Representação

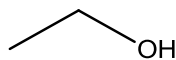


C₂H₅OH – Etanol ou álcool etílico

Qual a estrutura? Plana? Em caracol?



Porquê assim?

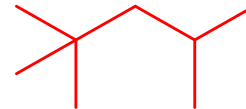


Química Orgânica I

Alcanos

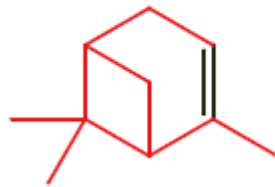


butano

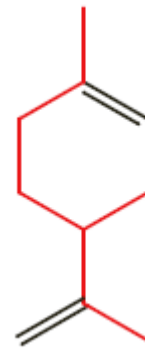


isooctano

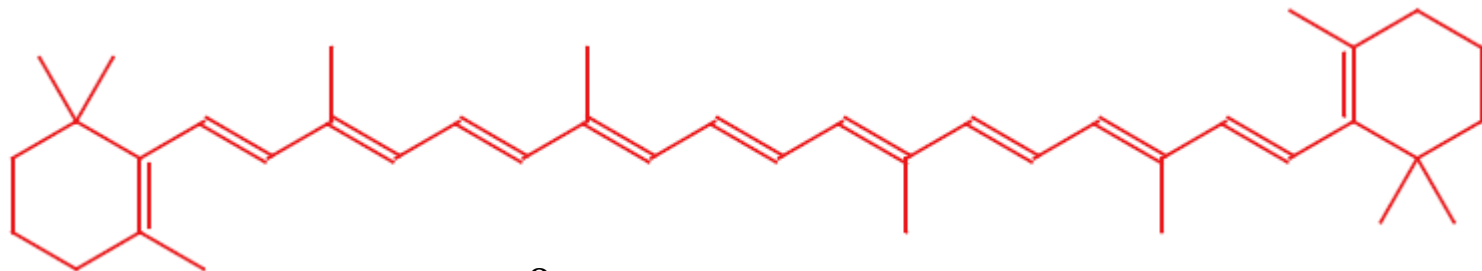
Alcenos



α -pineno



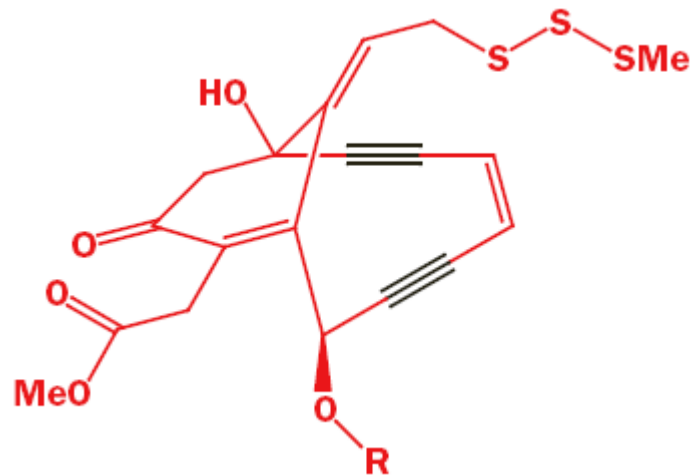
limoneno



β -caroteno

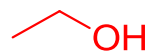
Química Orgânica I

Alcinos

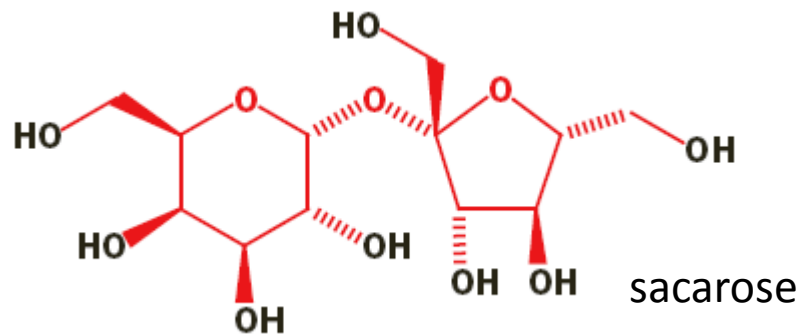


Calicheamicina
(agente antitumoral)

Álcoois



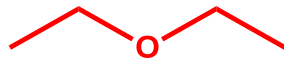
etanol



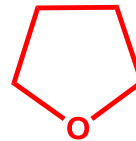
sacarose

Química Orgânica I

Éteres



Éter etílico

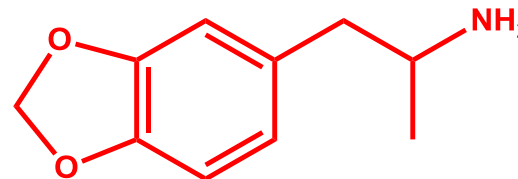


THF

Aminas



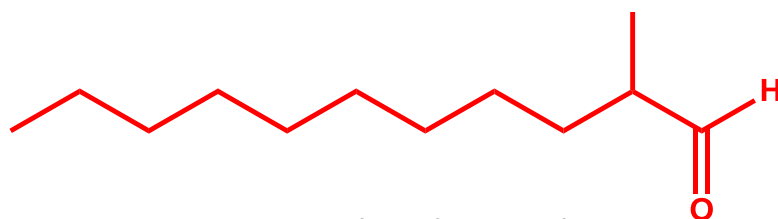
Putrescina



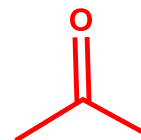
ecstasy

Química Orgânica I

Aldeídos e cetonas

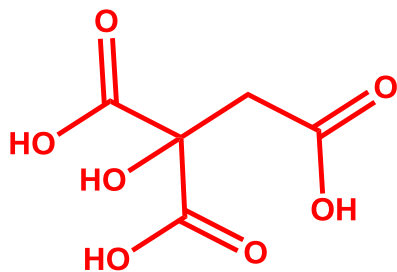


2-metilundecanal
Fragrância do “Chanel Nº 5”

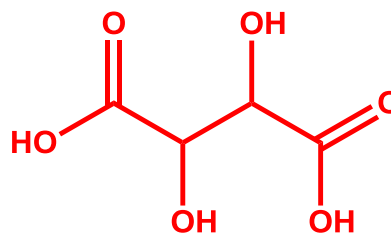


acetona

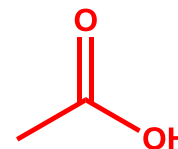
Ácidos carboxílicos



Ácido cítrico



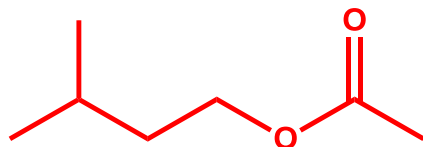
Ácido tartárico



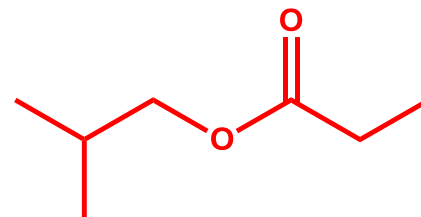
??

Química Orgânica I

Ésteres

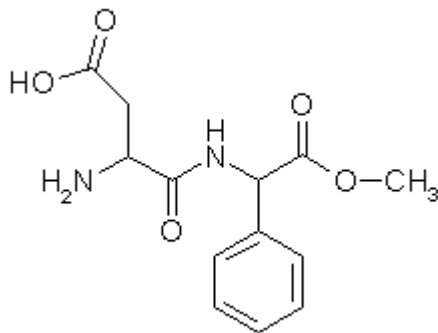


Isopentil acetato
(aroma a banana)

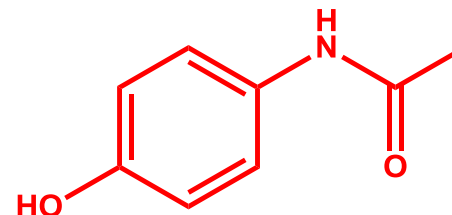


Isobutilpropionato
(aroma a rum)

Amidas



Aspartame

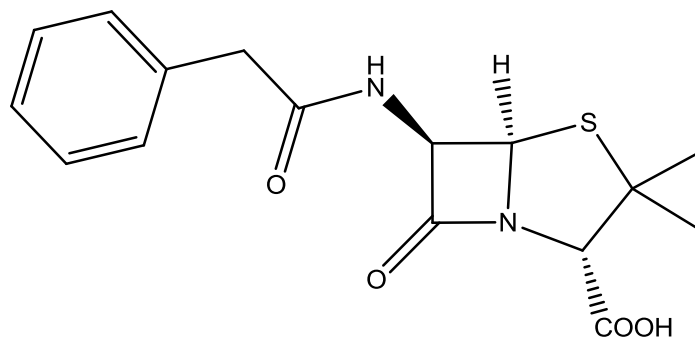


N-(4-hydroxyphenyl)acetamide

Paracetamol

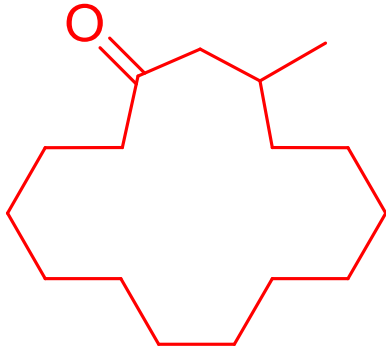
Química Orgânica

O que significa?



Penicilina G

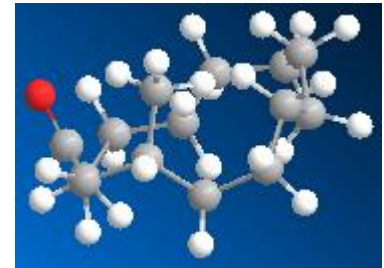
Química Orgânica I



muscona

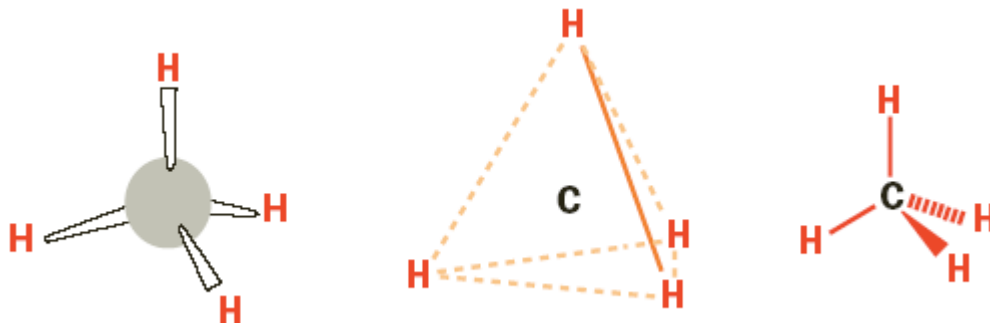


Veado almíscarado

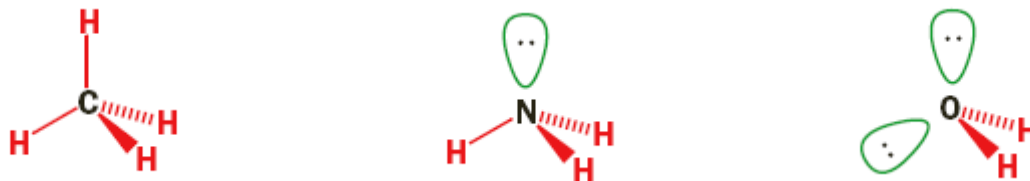


Química Orgânica I

Porquê?



Explicado pela **Teoria da Repulsão dos Pares de Electrões de Valência**



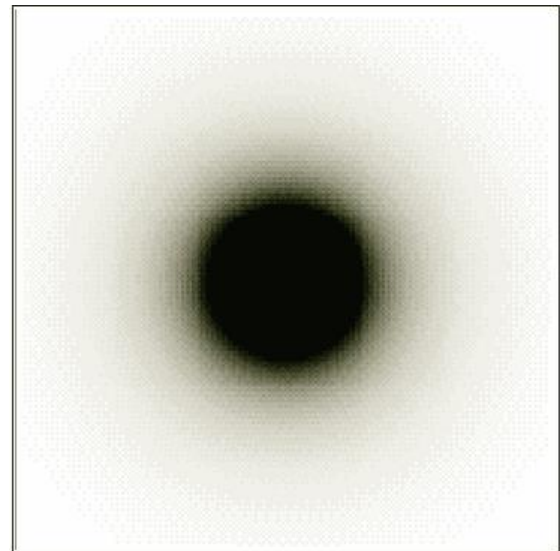
Não explica porque é que os ângulos no H_2S , PH_3 , AsH_3 ou SbH_3 têm ângulos de 90° ...

Química Orgânica I

Representação simples de



Uma orbital s (simetria esférica)



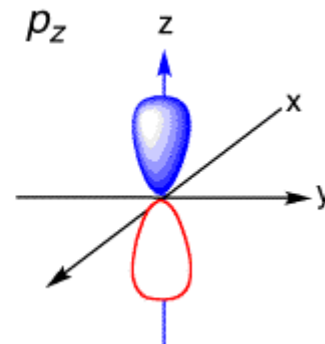
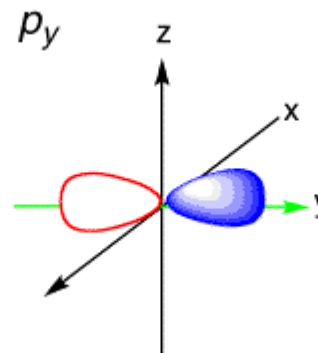
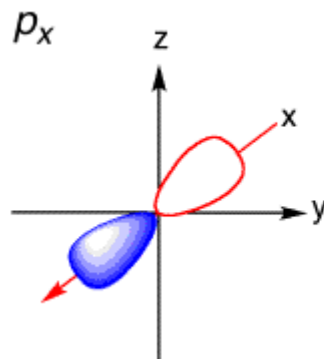
forma da orbital 1s

Química Orgânica I

Representação simples de



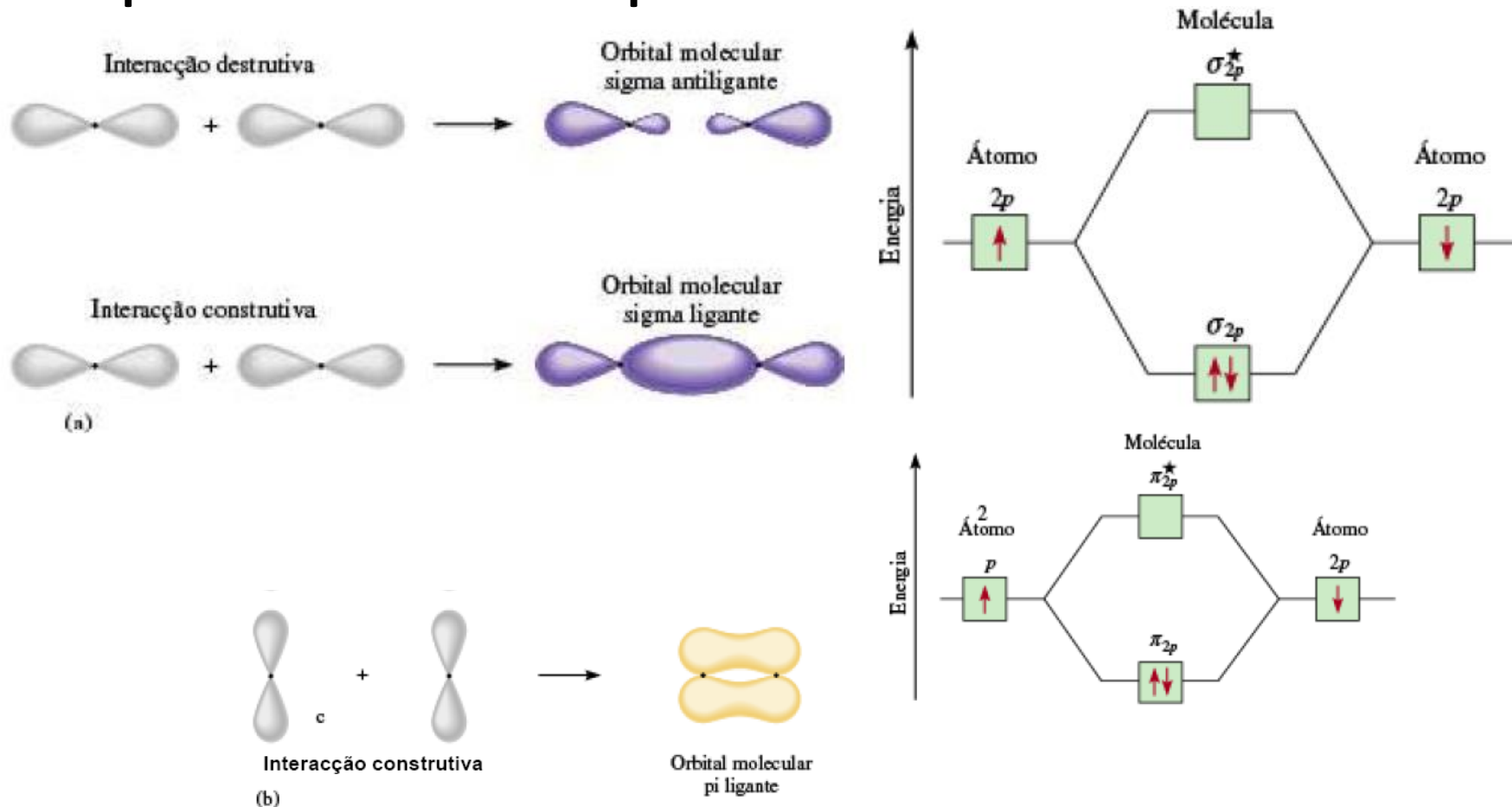
Uma orbital p



forma e orientação das 3 orbitais 2p

Química Orgânica I

Duas possíveis interações entre duas orbitais p equivalentes e as correspondentes orbitais moleculares



Química Orgânica I

Orbitais com simetrias diferentes não combinam, umas com as outras



p_z and p_x

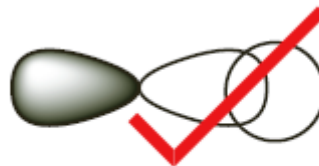


p_z and p_y



p and s

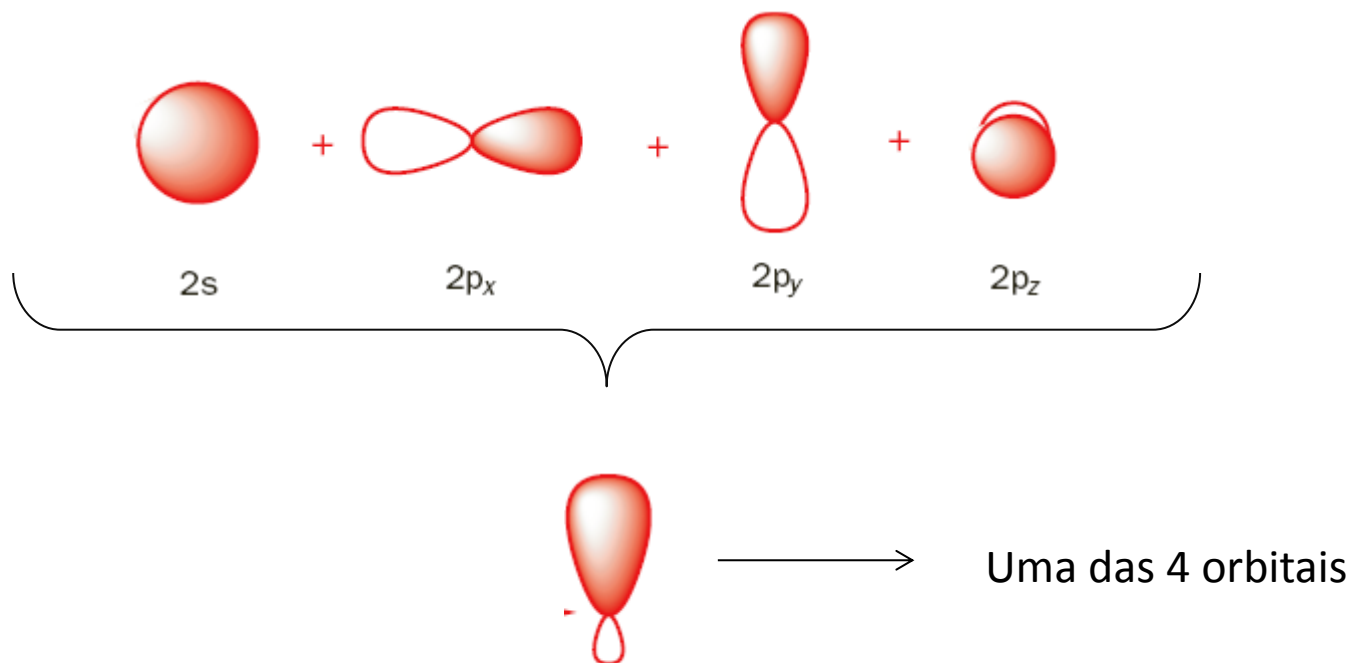
Orbitais s podem combinar com as extremidades das orbitais p para formar orbitais σ



p and s

Química Orgânica I

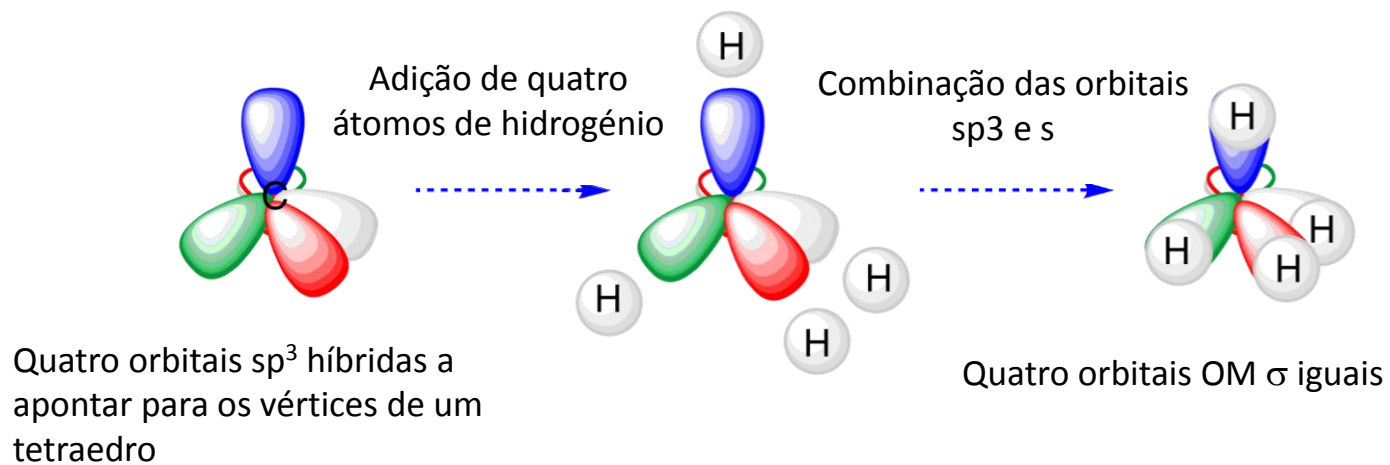
Quatro orbitais atômicas diferentes combinam



Para originar 4 orbitais híbridas degeneradas com orientações diferentes

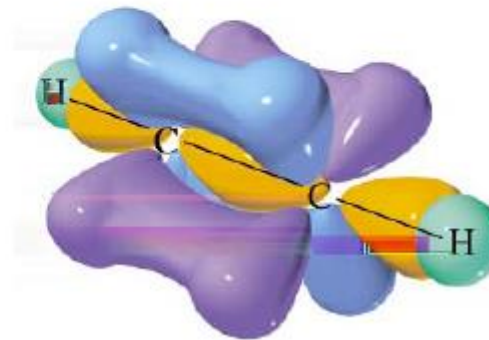
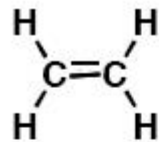
Química Orgânica I

A molécula de Metano



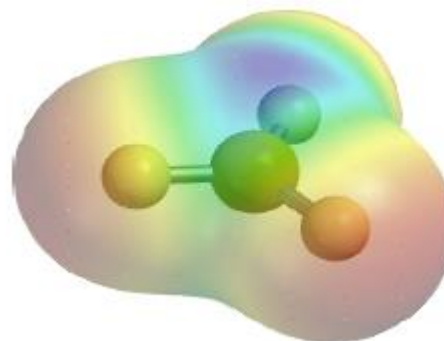
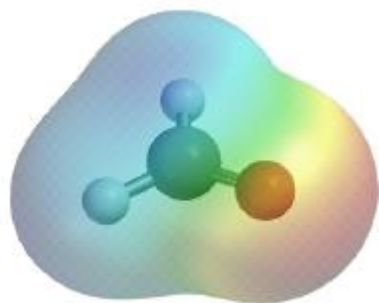
Química Orgânica I

Os casos do etileno (eteno) e acetileno(etino)



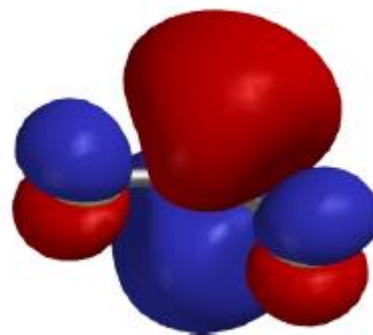
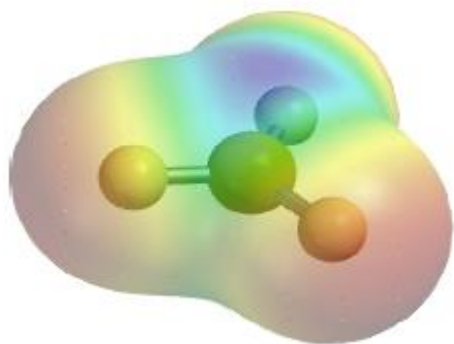
Química Orgânica I

Moléculas com Dipolos: Formaldeído vs BF_3



Química Orgânica I

Moléculas com Dipolos: BF_3



LUMO