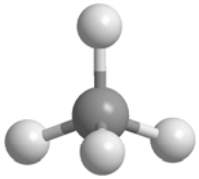
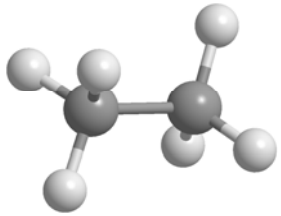
HIDROCARBONETOS

Alcanos: $C_nH_{(2n+2)}$

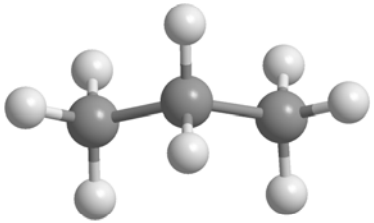
Metano: CH_4



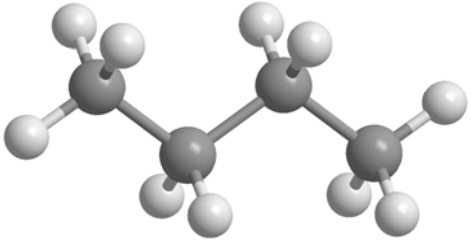
Etano: C_2H_6



Propano: C_3H_8

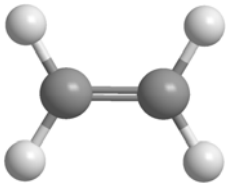


Butano: C_4H_{10}

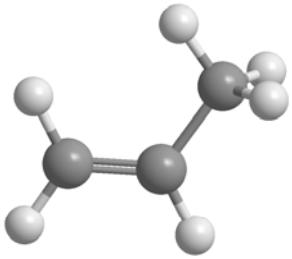


Alcenos: C_nH_{2n}

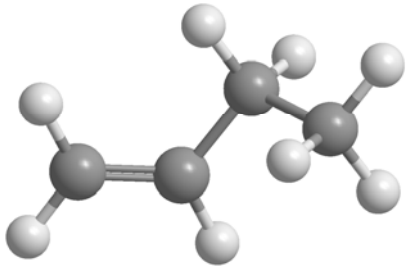
Eteno: C_2H_4



Propeno: C_3H_6

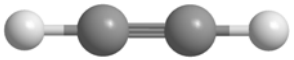


1-Buteno: C_4H_8

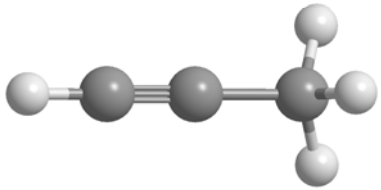


Alcinos: $C_nH_{(2n-2)}$

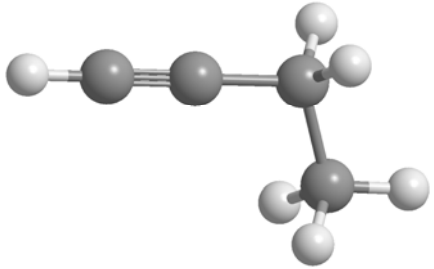
Etino: C_2H_2



Propino: C_3H_4

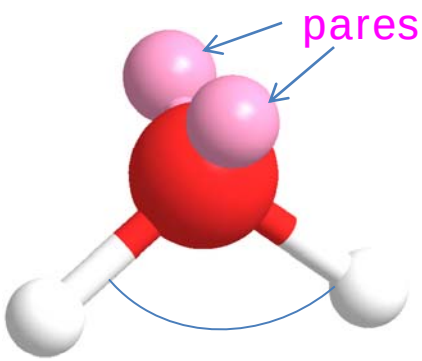


1-Butino: C_4H_6



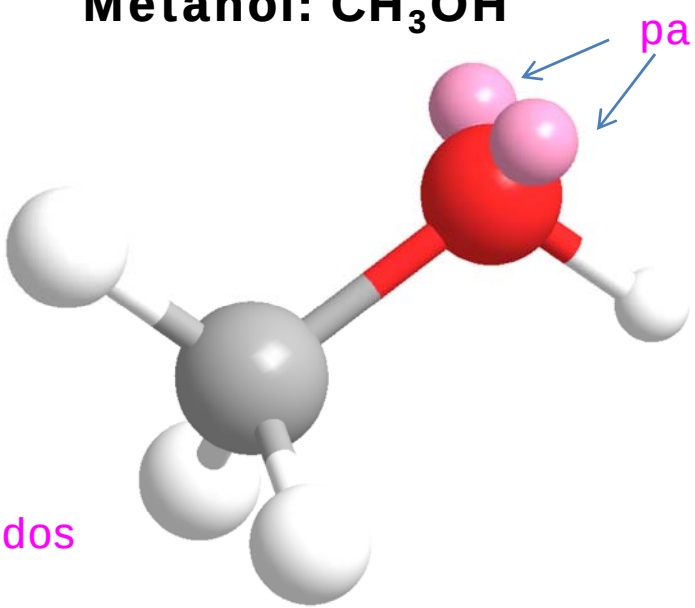
Oxigénio em hibridação sp_3: $1s^2\ 2sp_3^2\ 2sp_3^2\ 2sp_3^1\ 2sp_3^1$

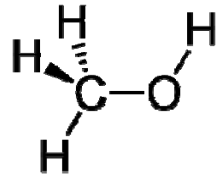
H_2O



Álcoois: R_3C-OH

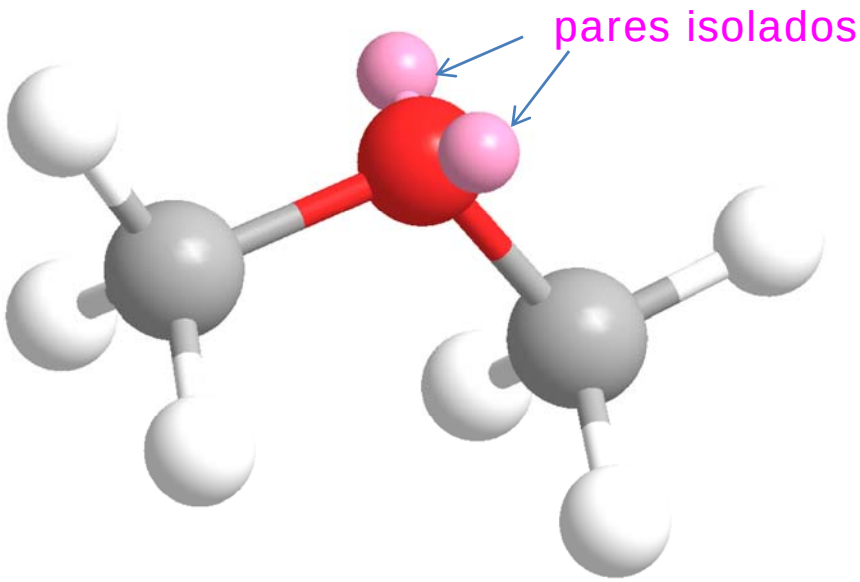
Metanol: CH_3OH





Éteres: R_3C-O-CR_3

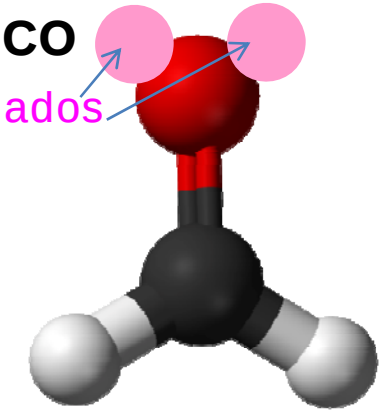
Dimetiléter:CH_3OCH_3

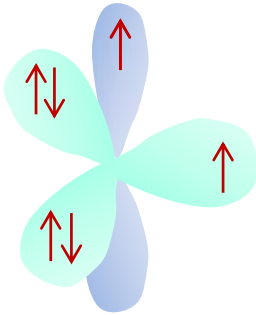


Oxigénio em hibridação sp_2: $1s^2\ 2sp_2^2\ 2sp_2^2\ 2sp_2^1\ 2p_z^1$

Aldeídos: R_2C-HO

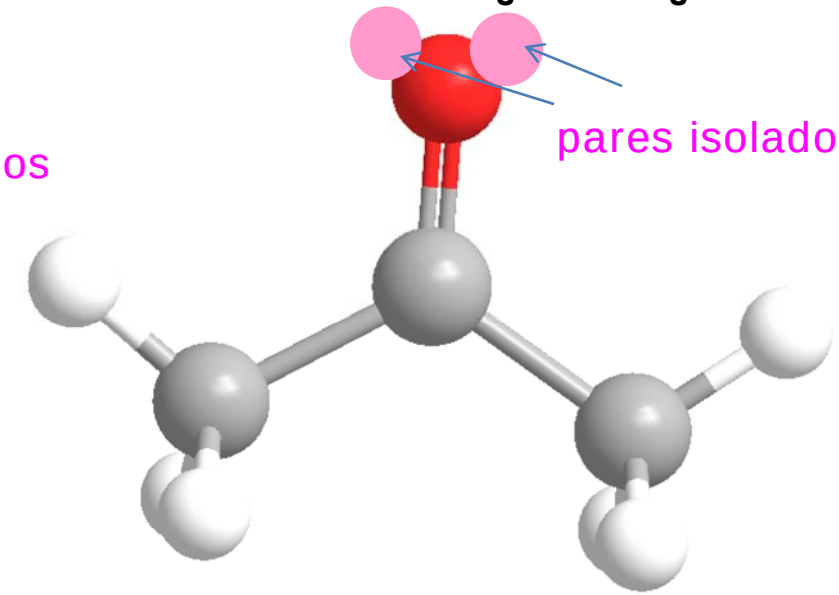
Formaldeído ou metanal: H_2CO





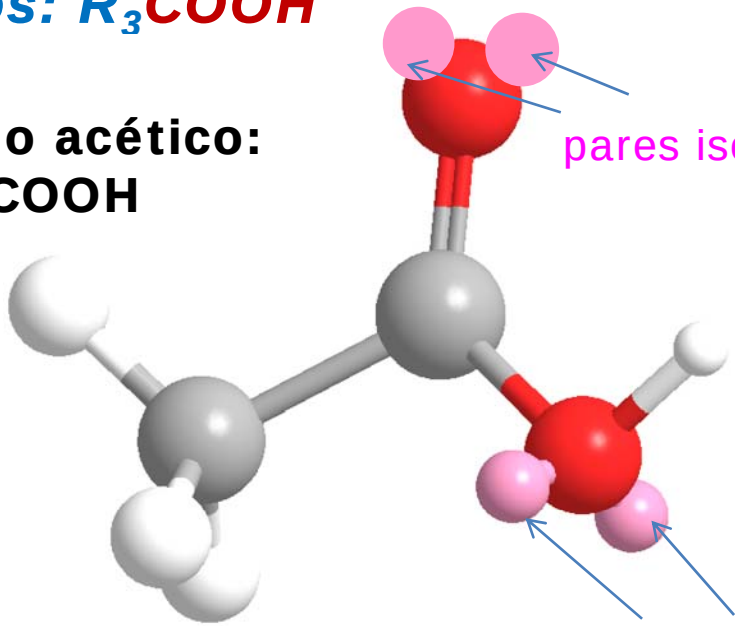
Cetonas: R_3C-O-CR_3

Acetona ou dimetilcetona: CH_3COCH_3



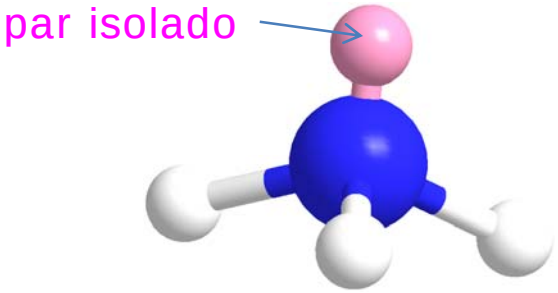
Ácidos: R_3COOH

Ácido acético: CH_3COOH



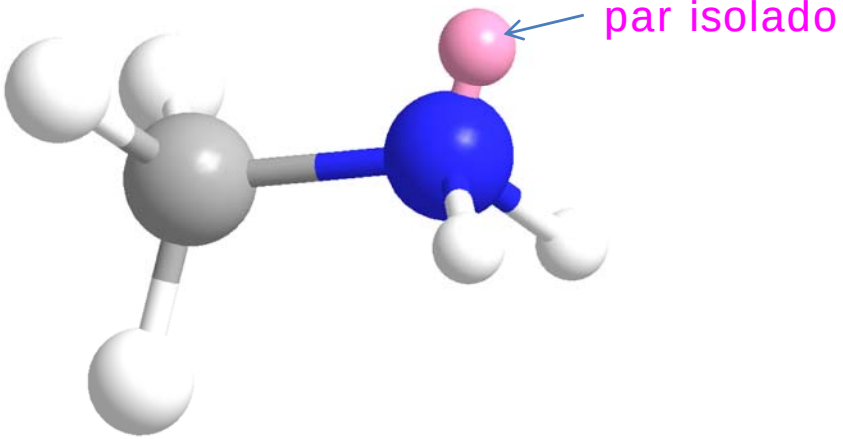
Azoto em hibridação sp_3: $1s^2\ 2sp_3^2\ 2sp_3^1\ 2sp_3^1\ 2sp_3^1$

NH_3



Aminas: R_3C-NH_2

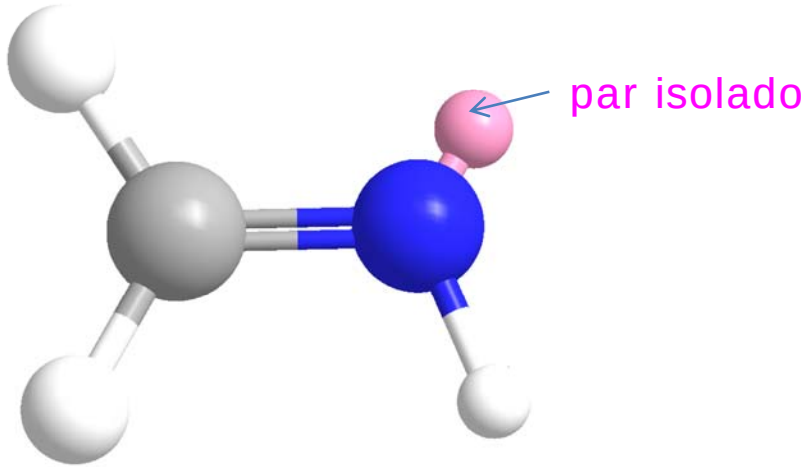
Metilamina: CH_3NH_2



Azoto em hibridação sp_2: $1s^2\ 2sp_2^2\ 2sp_2^1\ 2sp_2^1\ 2p_z^1$

Iminas: R_2C-NH

Metanimina:CH_2NH



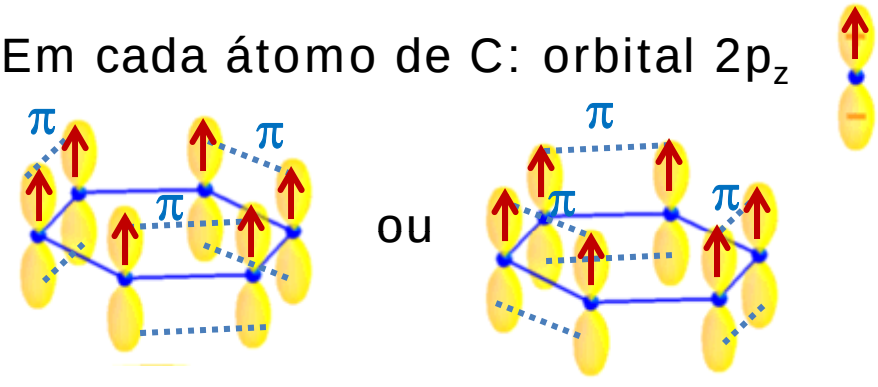
Ligações deslocalizadas

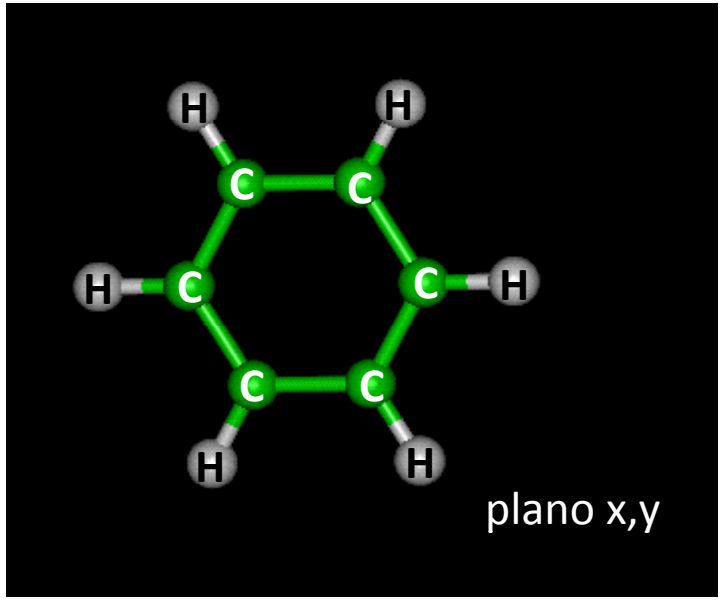
Benzeno: C_6H_6

Carbono em hibridação sp_2

^6C: $1s^2\ 2sp_2^1\ 2sp_2^1\ 2sp_2^1\ 2p_z^1$

Em cada átomo de C: orbital $2p_z$

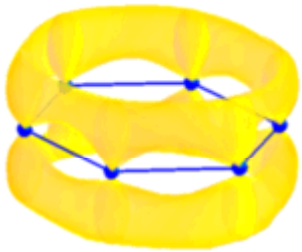


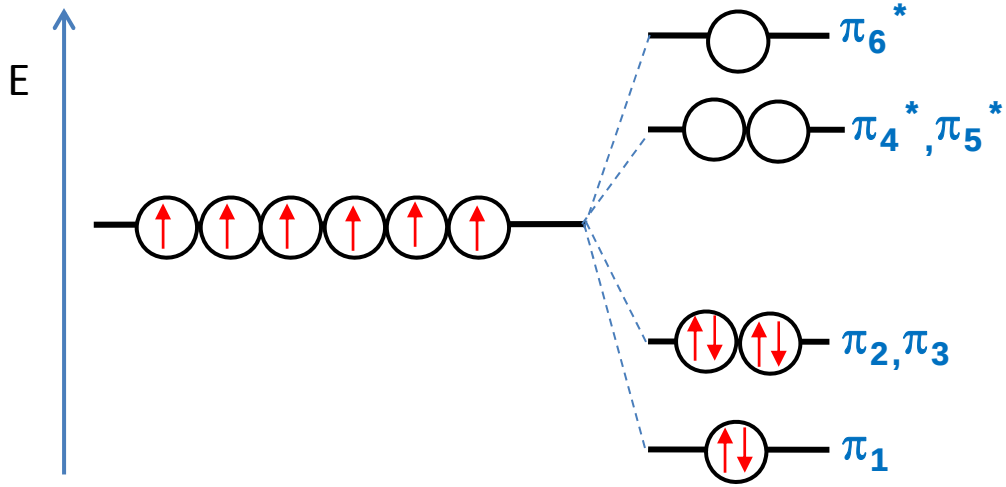


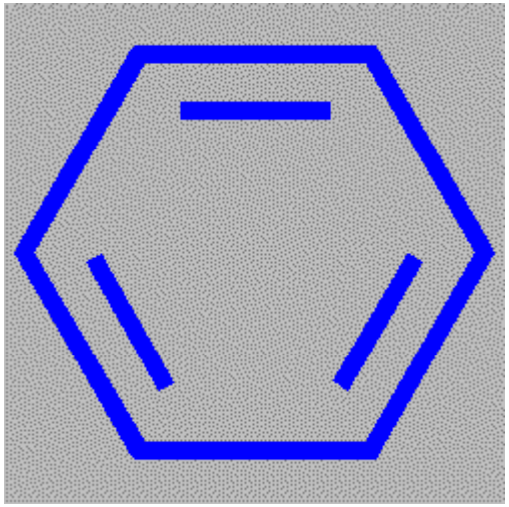
Esqueleto da molécula: ligações σ

ou ainda outras hipóteses... **ressonância**

TOM: 6 orbitais moleculares π estendidas a toda a molécula

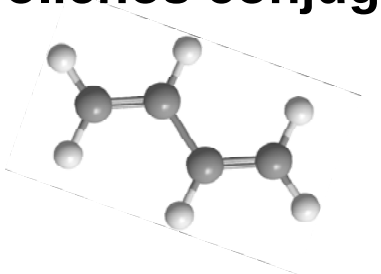




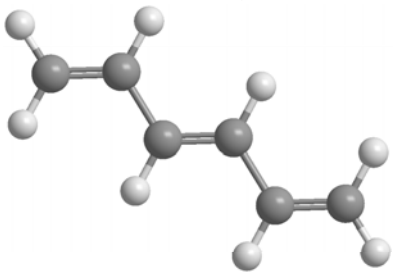


Ligações deslocalizadas

Polienos conjugados

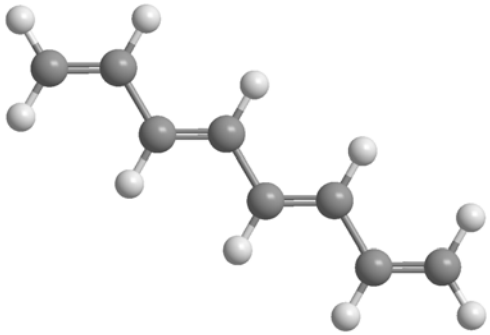


1,3-butadieno

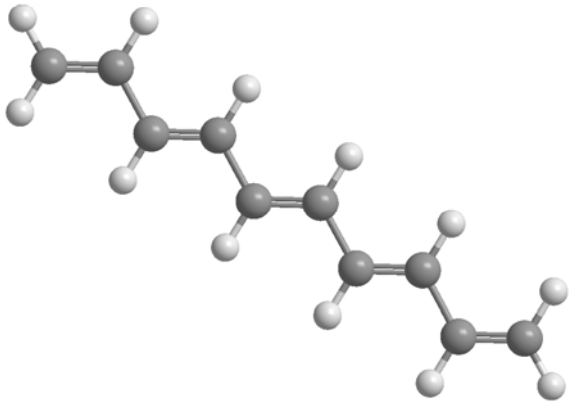


1,3,5-hexatrieno

C em hibridação sp_2:
deslocalização dos e-s π a todos os átomos de C em hibridação sp_2



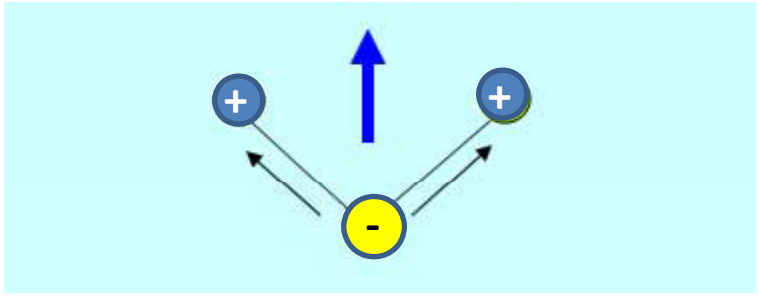
1,3,5,7-octatetraeno



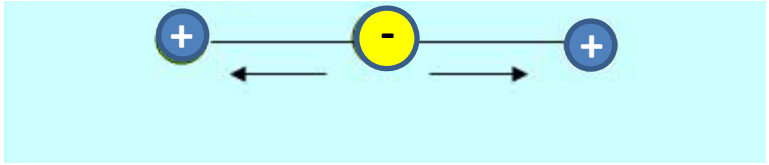
1,3,5,7,9-decapentaeno

Momento Dipolar de Moléculas Poliatómicas

Resultante da soma vectorial dos dipolos das ligações:



$\mu \neq 0$

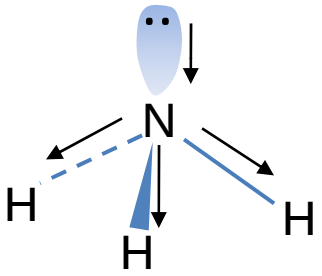


$\mu = 0$

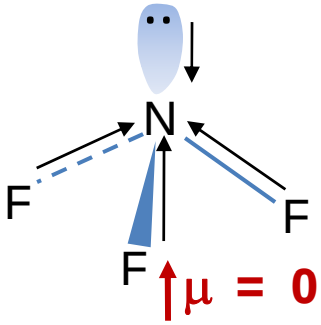
Momento dipolar de moléculas poliatómicas

NH_3

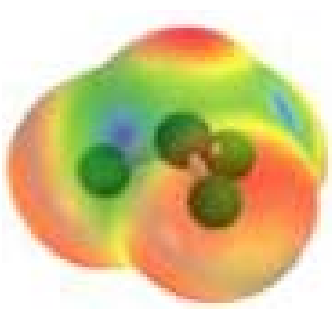
μ = 1.46 D



NF_3



μ = 0.24 D

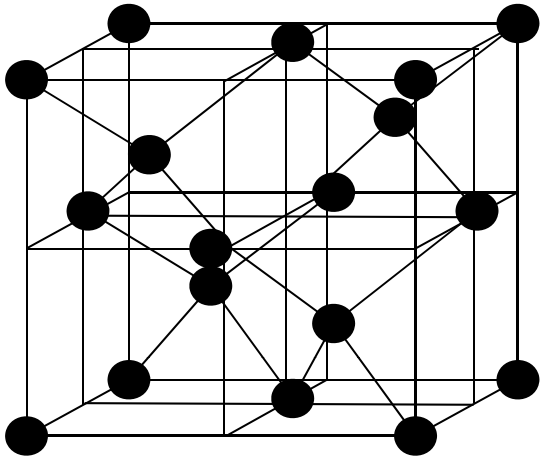


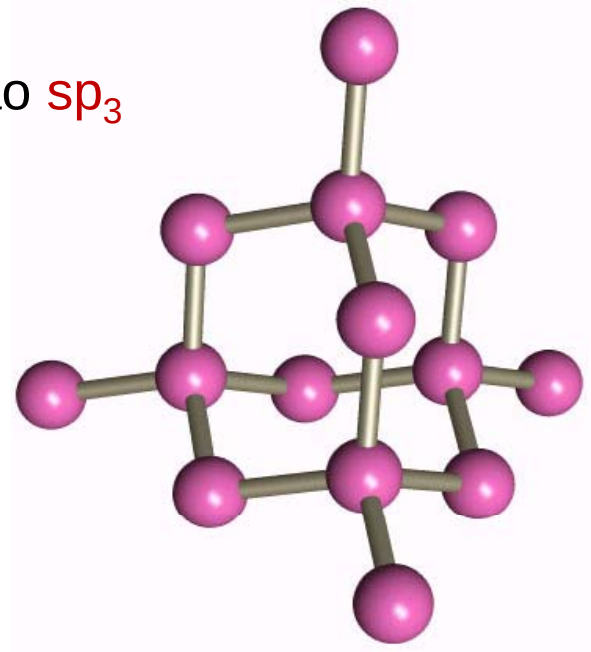
Momentos Dipolares de Algumas Moléculas

Composto	μ / D
Metano (CH_4)	0
Etano (C_2H_5)	0
Propano (C_3H_8)	0.084
Etanol (C_2H_5OH)	1.69
1-Propanol (C_3H_7OH)	1.68
Éter dimetílico (CH_3OCH_3)	1.30
Metilamina (CH_3NH_2)	1.31
Etanal (CH_3CHO)	2.69
Propanal (CH_3CH_2CHO)	2.52
Ácido Etanóico (CH_3COOH)	1.74
Fluorometano (CH_3F)	1.85

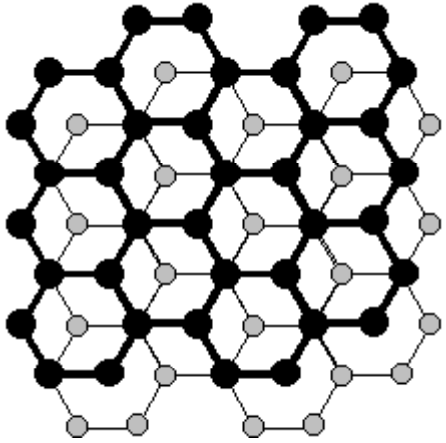
Cristais Covalentes

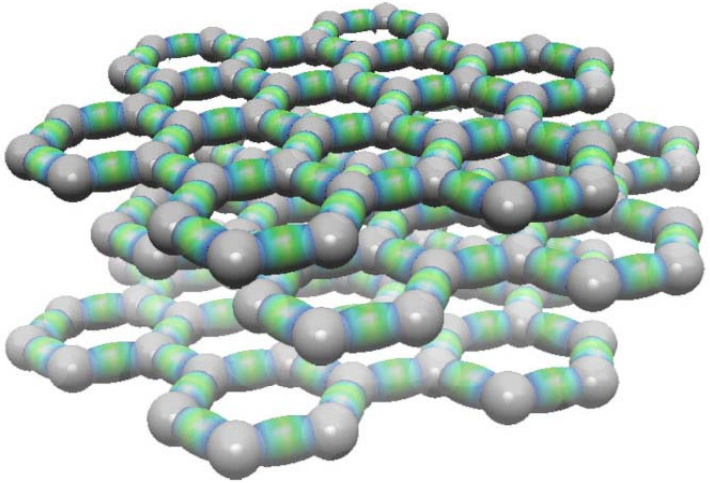
Diamante: cristal formado por C em hibridação sp_3





Grafite: planos formados por C em hibridação sp_2



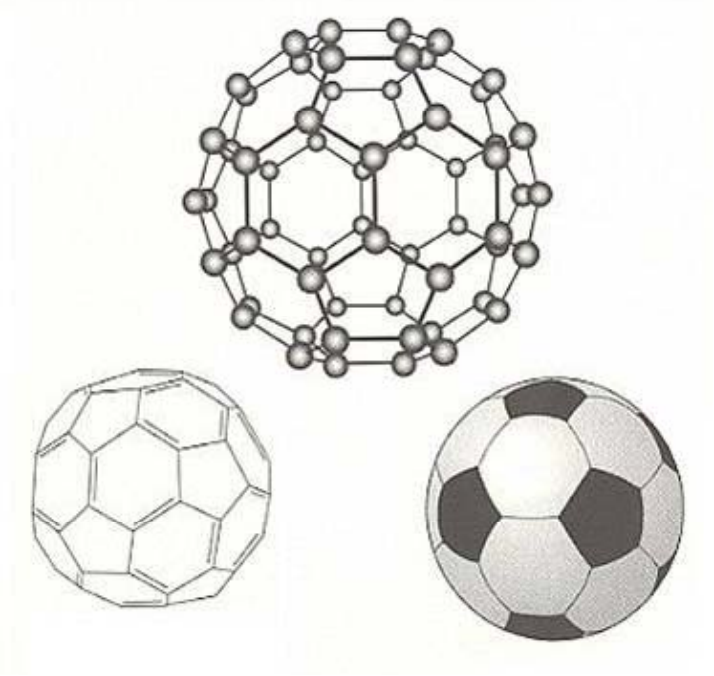


C_{60} (fulereno ou futebuleno):

superfície esférica formada por C em hibridação sp_2

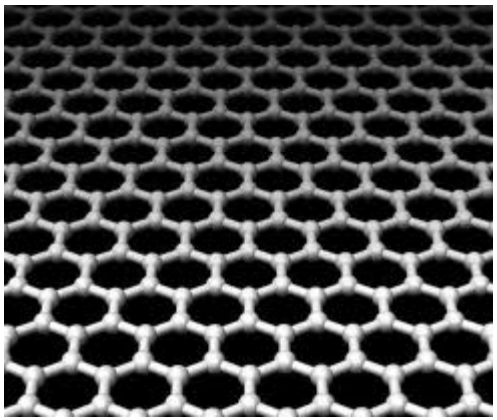
Pavilhão dos Estados Unidos da América
Exposição Mundial de 1967 (Montreal, Canada)

Arquitecto: Buckminster Fuller (Bucky)

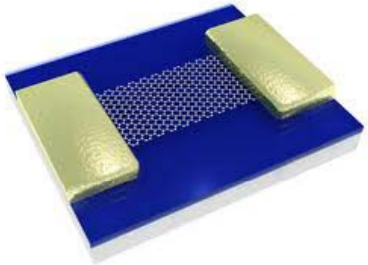


1985: ***Harold Kroto, Richard Smalley, Robert Curl***
(Nobel da Química em 1996)

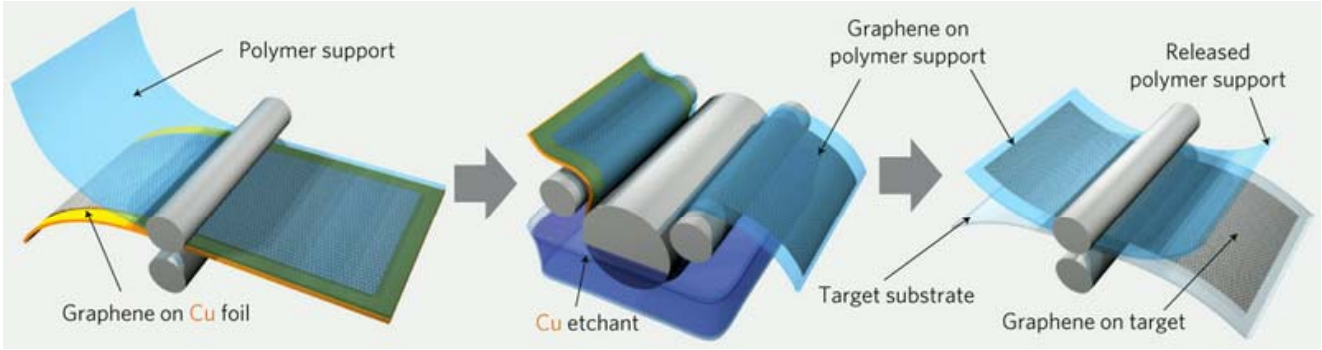
Grafeno: material bidimensional formado por uma camada de átomos de C em hibridação sp_2



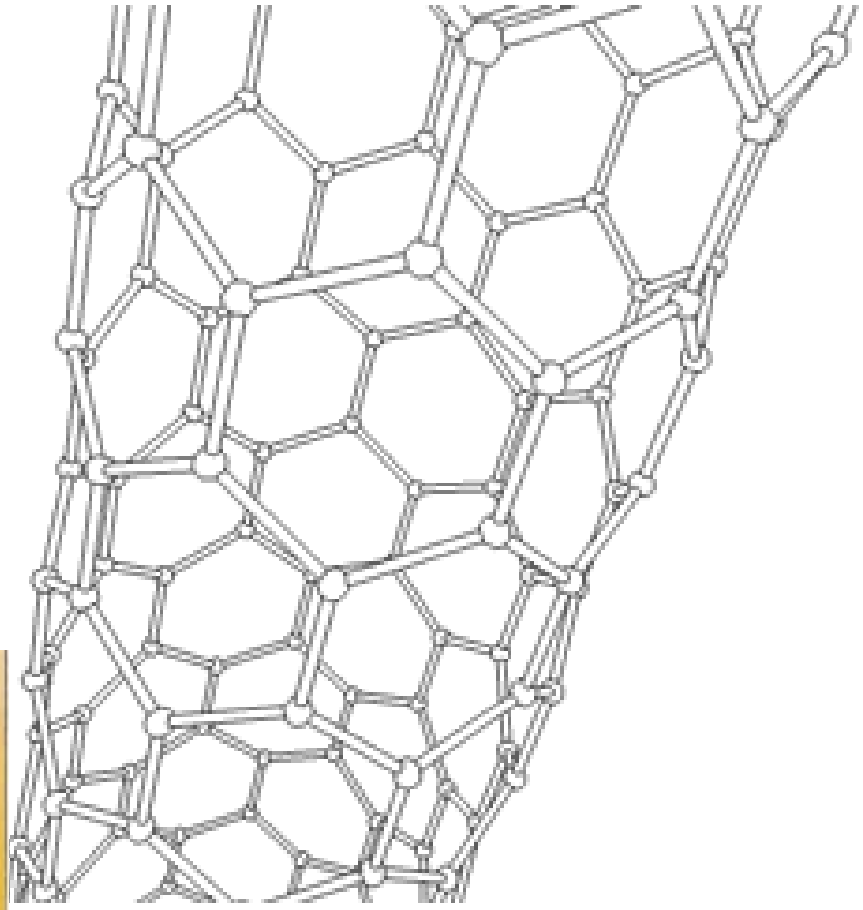
O prémio Nobel da Física em 2010 foi atribuído a Andre Geim e Konstantin Novoselov por trabalhos pioneiros com inovadoras com o material bi-dimensional grafeno

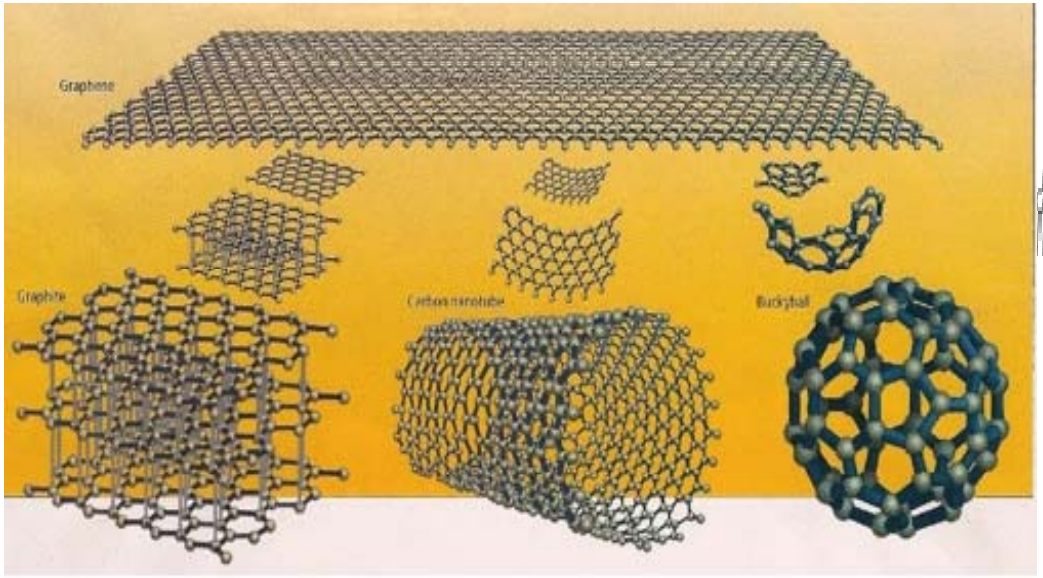


Aplicável em nanoelectrónica



Grafenos





Sumário 8

Ligação Química

- **Teoria das Orbitais Moleculares (TOM)**
  - **II. Método do Enlace de Valência**
    - **Moléculas Poliatómicas**

      - Álcoois; Éteres

      - Cetonas; Ácidos

      - Aminas; Imina

      - Outras Moléculas Envolvendo Átomos do 2º Período: Be e B

      - Moléculas onde falha a Aproximação das Ligações Localizadas: Benzeno; Polienos conjugados

      - Moléculas envolvendo Átomos do 3º Período

    - **Momentos Dipolares de Moléculas Poliatómicas.**
    - **Cristais Covalentes:** Diamante; Grafite; Fulerenos; Grafenos