

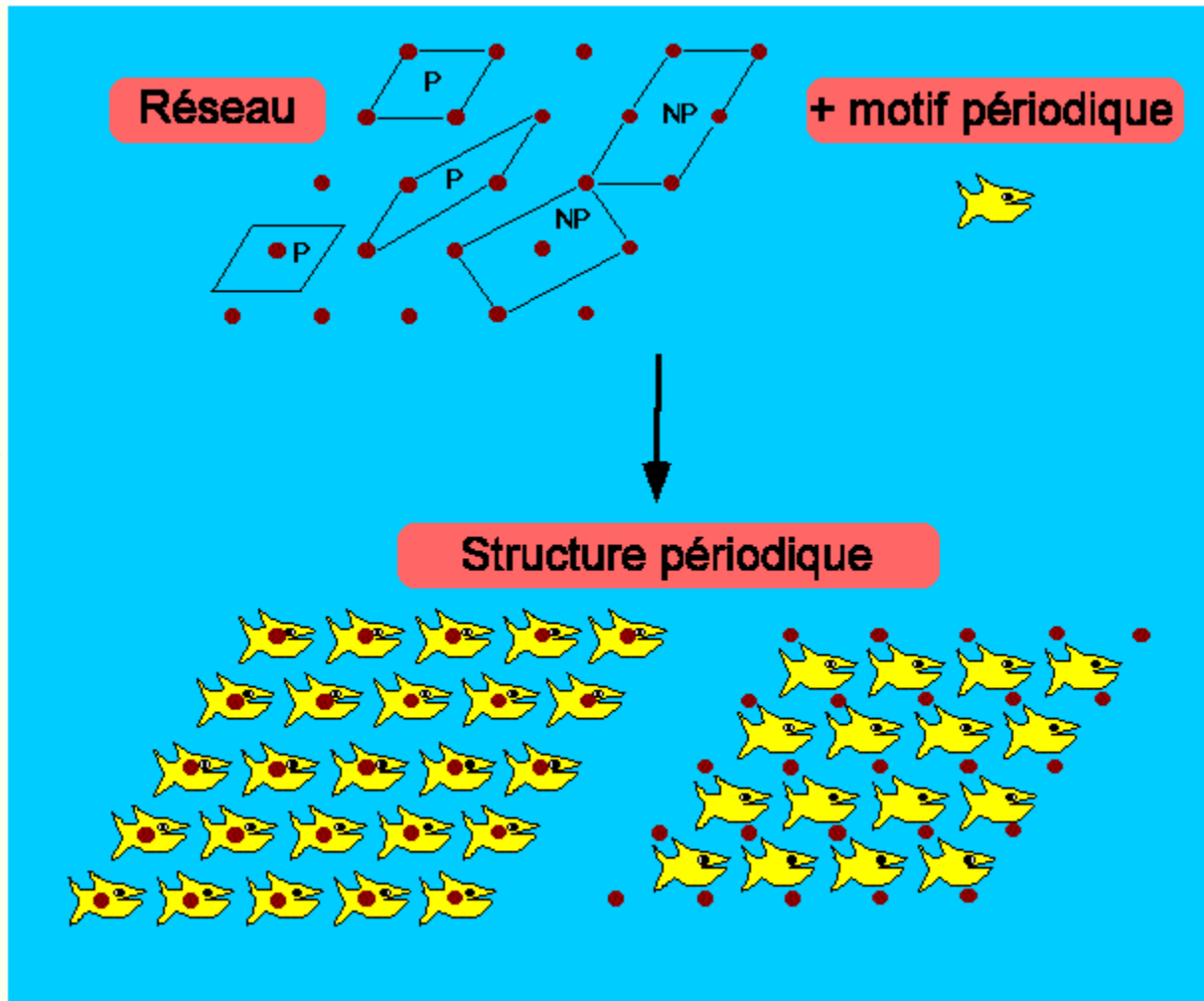


UNIVERSITÉ DE BATNA
FACULTÉ DE MÉDECINE
DÉPARTEMENT DE PHARMACIE
COURS DE CHIMIE MINÉRALE

Les empilements de sphères

Dr H. Madani

STRUCTURE CRISTALLINE

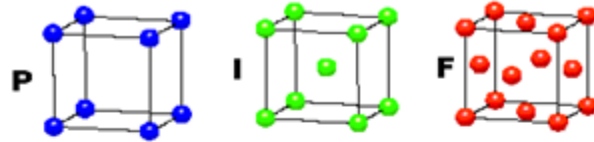


LES 14 RÉSEAUX DE BRAVAIS

Cubique

$$a = b = c$$

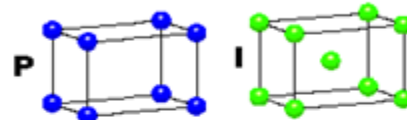
$$\alpha = \beta = \gamma = 90^\circ$$



Quadratique

$$a = b \neq c$$

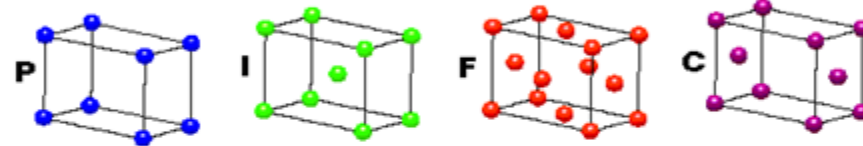
$$\alpha = \beta = \gamma = 90^\circ$$



Orthorhombique

$$a \neq b \neq c$$

$$\alpha = \beta = \gamma = 90^\circ$$

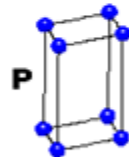


Hexagonal

$$a = b \neq c$$

$$\alpha = \beta = 90^\circ$$

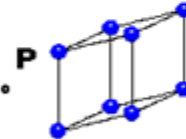
$$\gamma = 120^\circ$$



Trigonal

$$a = b = c$$

$$\alpha = \beta = \gamma \neq 90^\circ$$



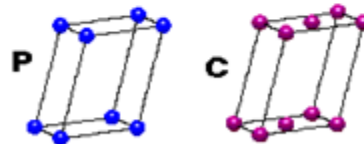
4 types de réseau

Monoclinique

$$a \neq b \neq c$$

$$\alpha = \gamma = 90^\circ$$

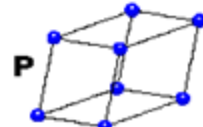
$$\beta \neq 120^\circ$$



Triclinique

$$a \neq b \neq c$$

$$\alpha \neq \beta \neq \gamma \neq 90^\circ$$



4 types de réseau

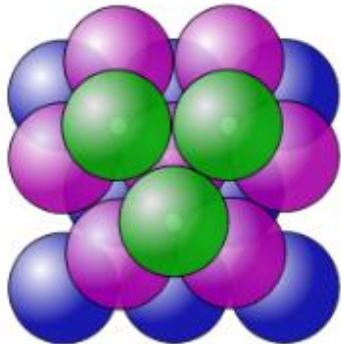
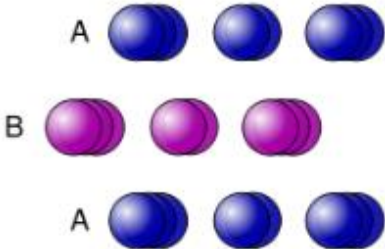
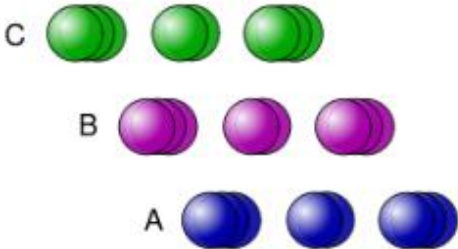
- P Primitif
- I centré
- F toutes faces centrées
- C 1 face centrée

+ 7 systèmes cristallins
= 14 réseaux de BRAVAIS

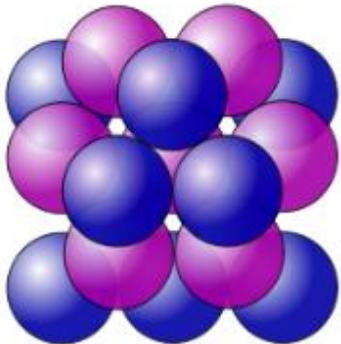


EMPILEMENT COMPACT DE SPHÈRES

x



Cubique à faces centrées ABC

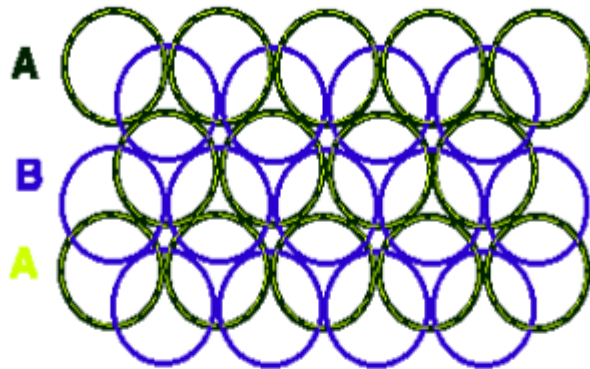


Hexagonal compact ABA



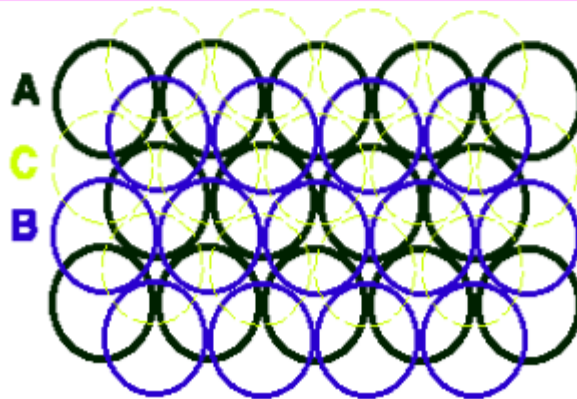
EMPILEMENT COMPACT DE SPHÈRES

3 couches



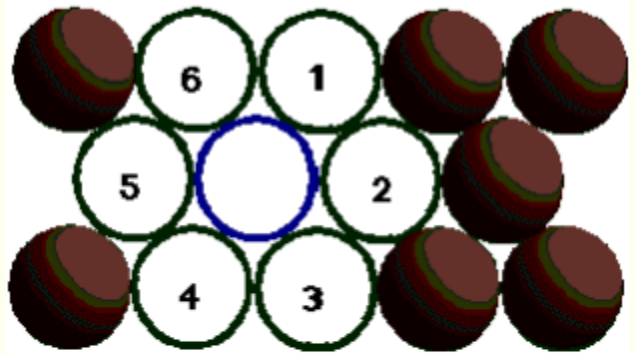
ABA Empilement Hexagonal compact (HCP)

ABC Empilement Cubique Faces Centrées (CCP)

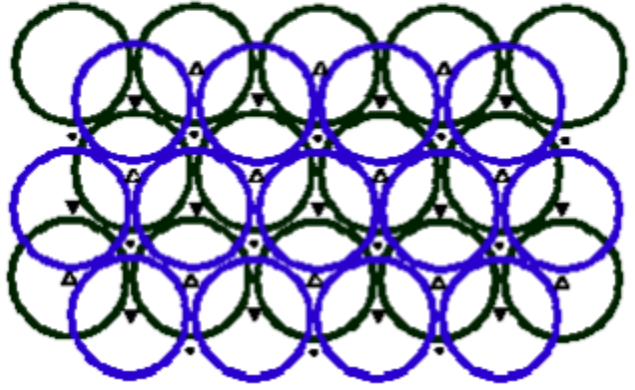


EMPILEMENT COMPACT DE SPHÈRES

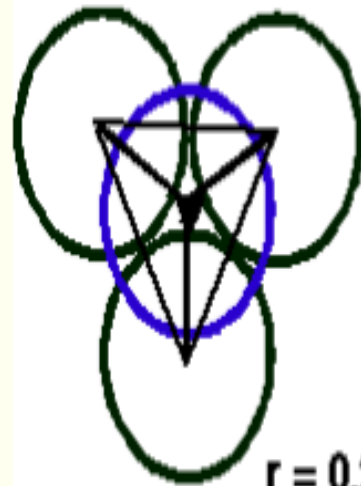
1 couche



2 couches



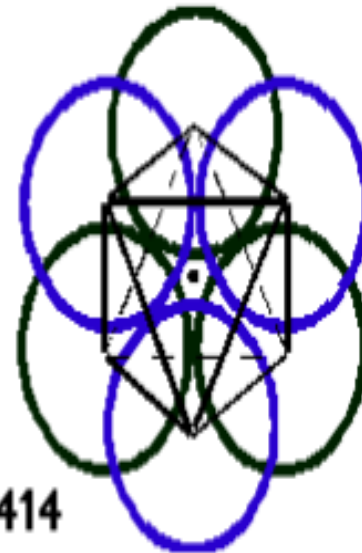
SITES TÉTRAÉDRIQUE & OCTAÉDRIQUE



$r = 0.225$

Tétraédrique

Sites



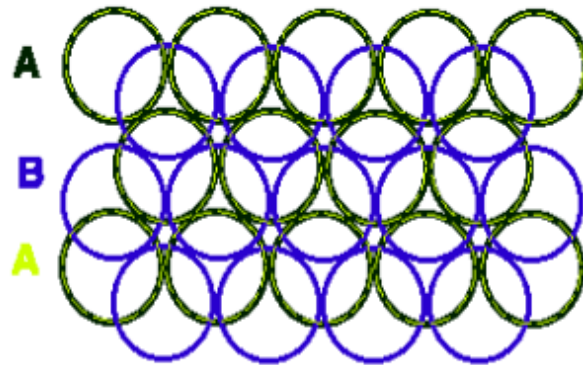
$r = 0.414$

Octaédrique



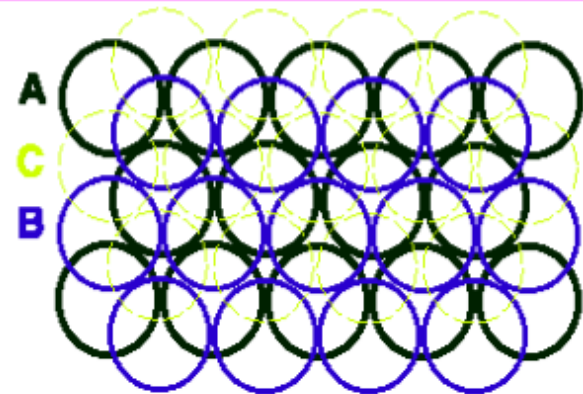
EMPILEMENT AB ET ABC

3 couches

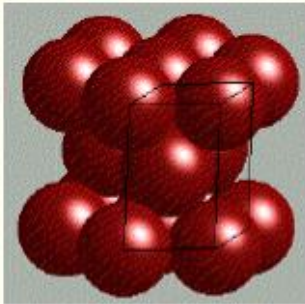


ABA Empilement Hexagonal compact (HCP)

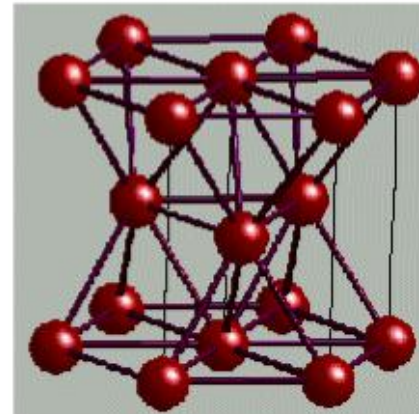
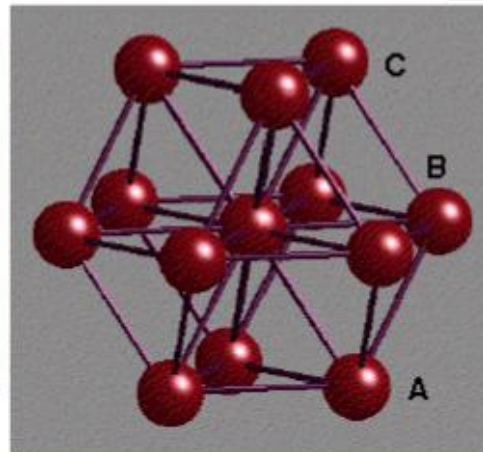
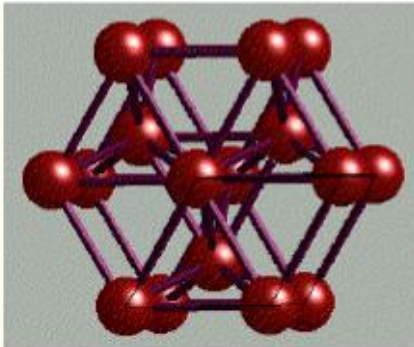
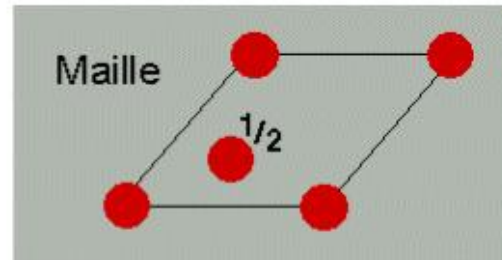
ABC Empilement Cubique Faces Centrées (CCP)



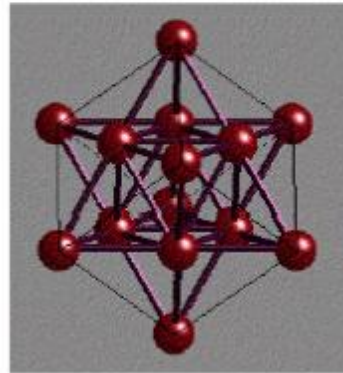
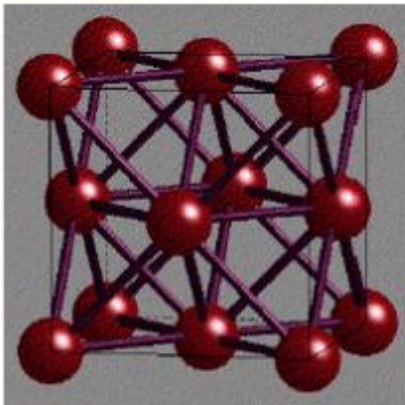
EMPILEMENT HC



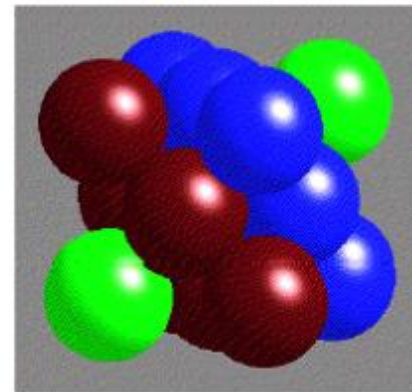
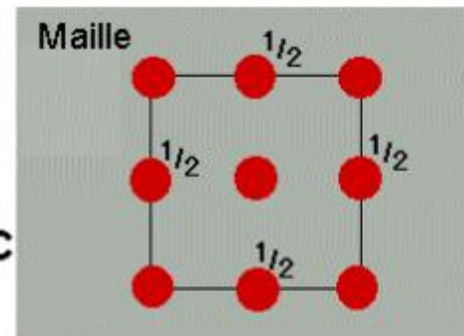
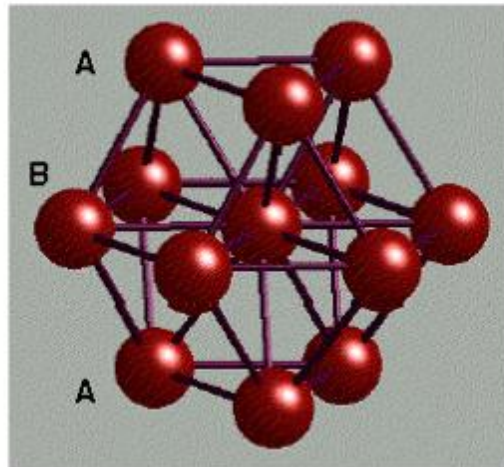
**Empilement
Hexagonal compact
HCP**



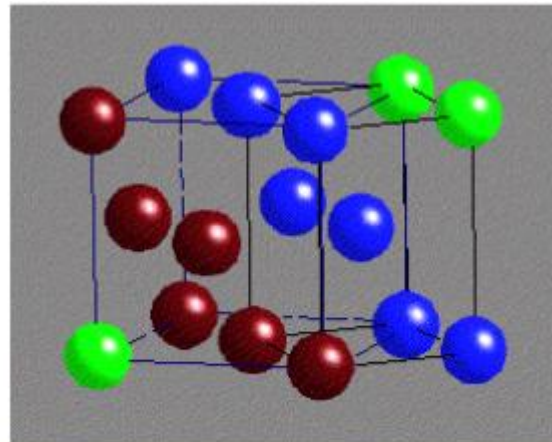
EMPILEMENTS CC & CFC



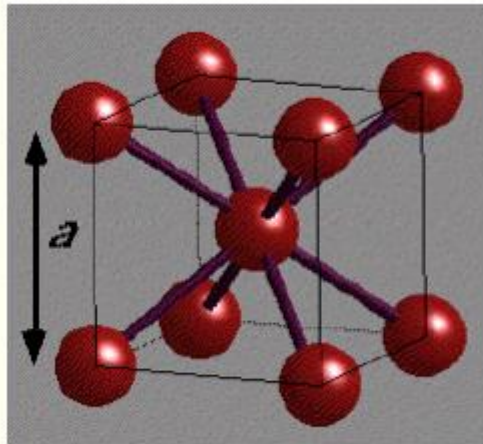
Empilement
Cubique Compact - CCP
=
Cubique Faces Centrées - CFC



MAILLE QUADRATIQUE

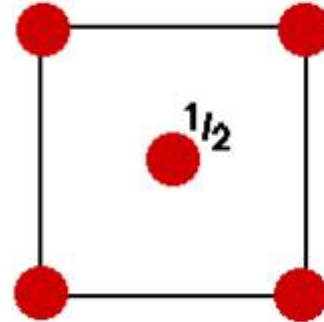


CUBIQUE CENTRÉ



Cubique Centré

BCC



Merci pour votre attention

