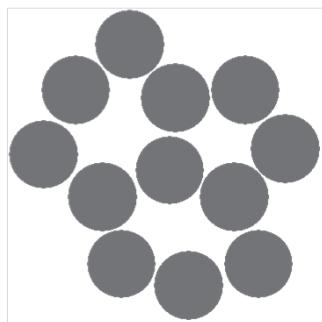
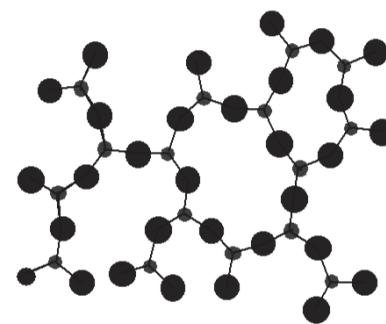


# Pevné látky



**Amorfni**



Metastabilni

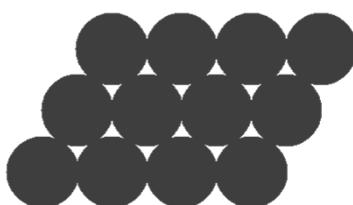
Vazebná  
energie

**Energy**

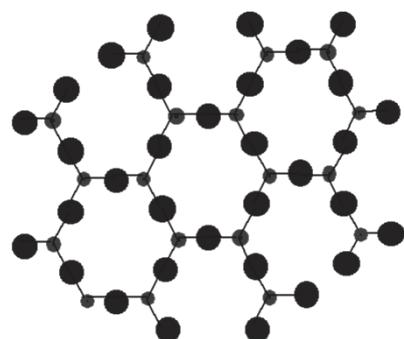
Vazebná  
délka

or

r



**Krystallické**



Stabilni

Vazebná  
energie

**Energy**

Vazebná  
délka

or

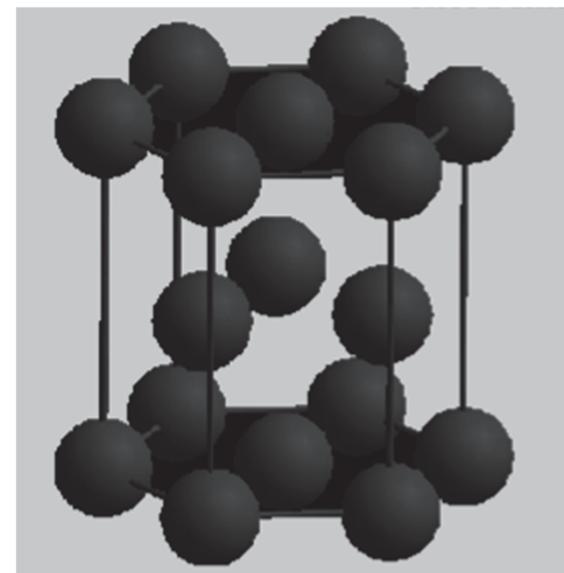
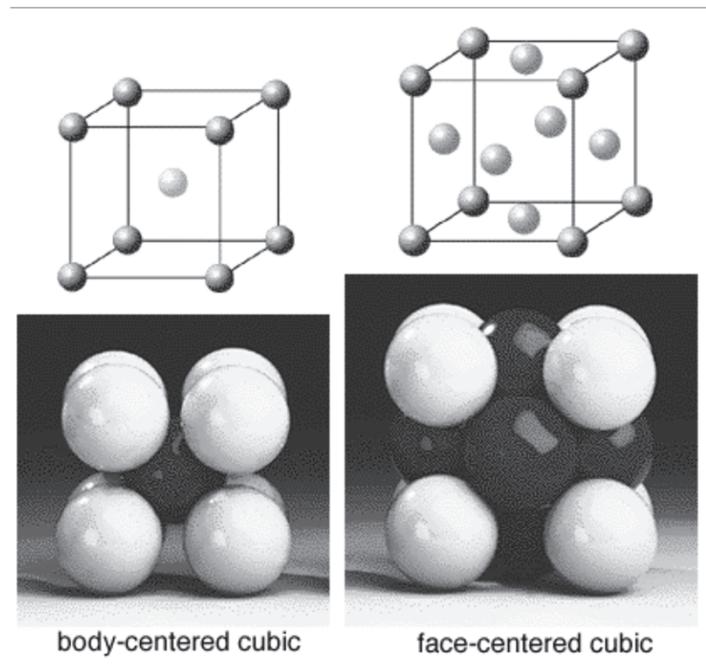
r

# Struktura kovů

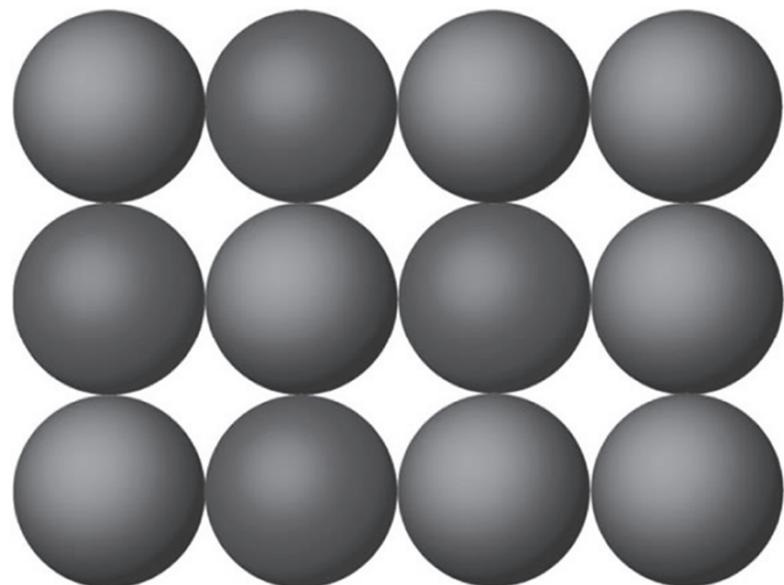
Nejtěsnější kubické uspořádání

Nejtěsnější hexagonální uspořádání

Tělesně centrovaná kubická mřížka

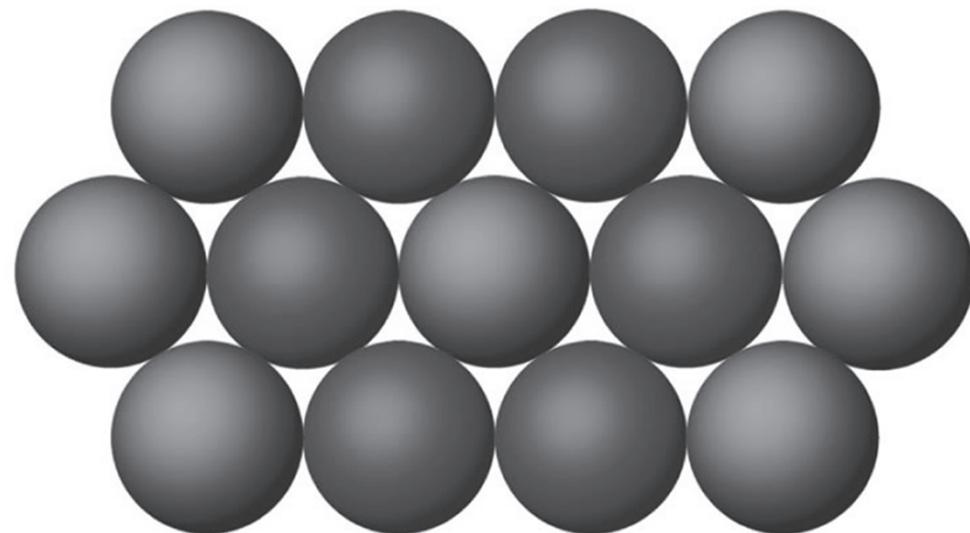


## Nejtěsnější uspořádání na ploše



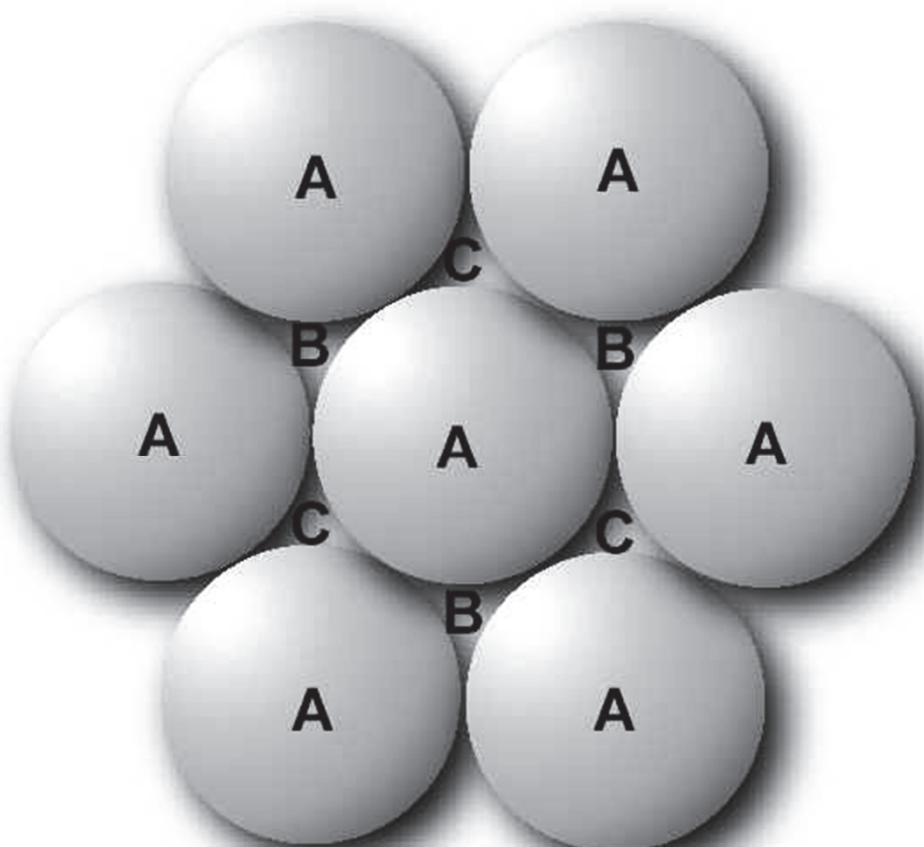
(a) An "open" packing

Čtvercové uspořádání  
Hodně volného prostoru  
4 sousední atomy

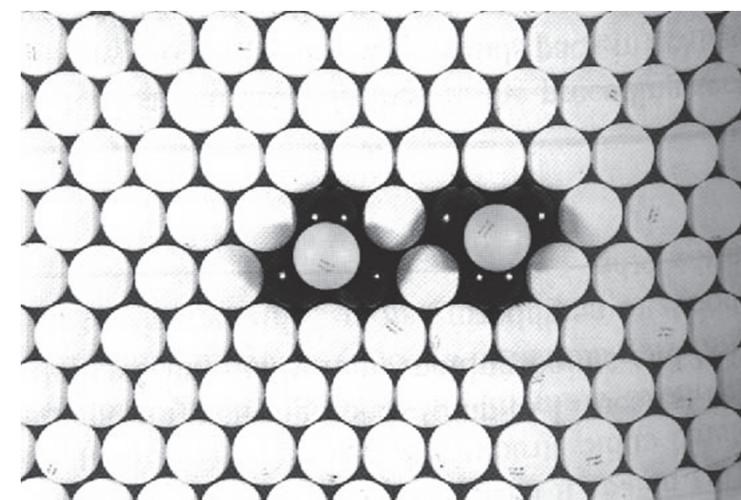
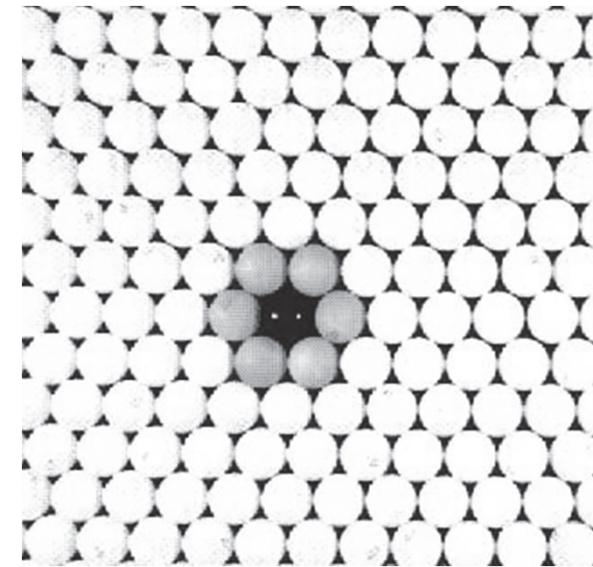


(b) Close packing

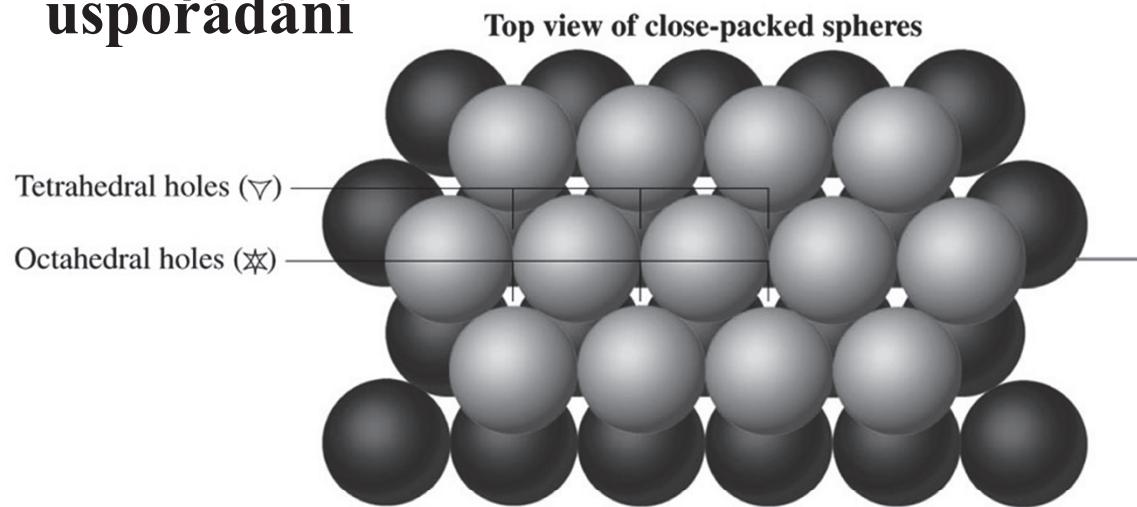
Hexagonální uspořádání  
Nejlepší využití prostoru  
6 sousedních atomů



Mezery B a C nemohou být  
zároveň obsazeny atomy  
(v druhé vrstvě)

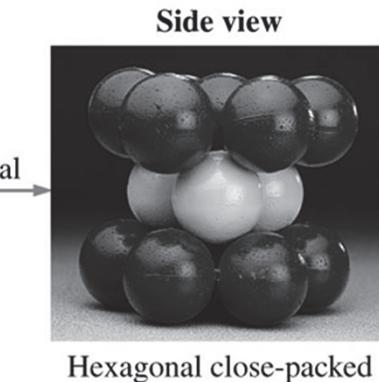


## Dvě vrstvy nejtěsnějšího uspořádání



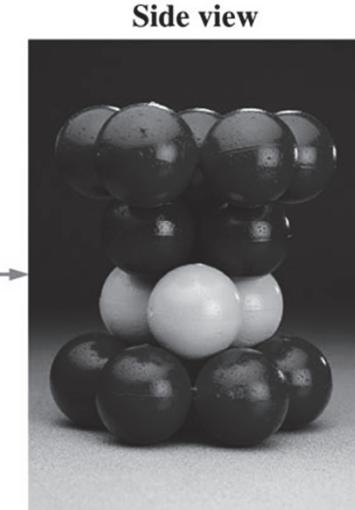
Johannes Kepler 1611

## hexagonální



Cover  
tetrahedral  
holes in  
layer B

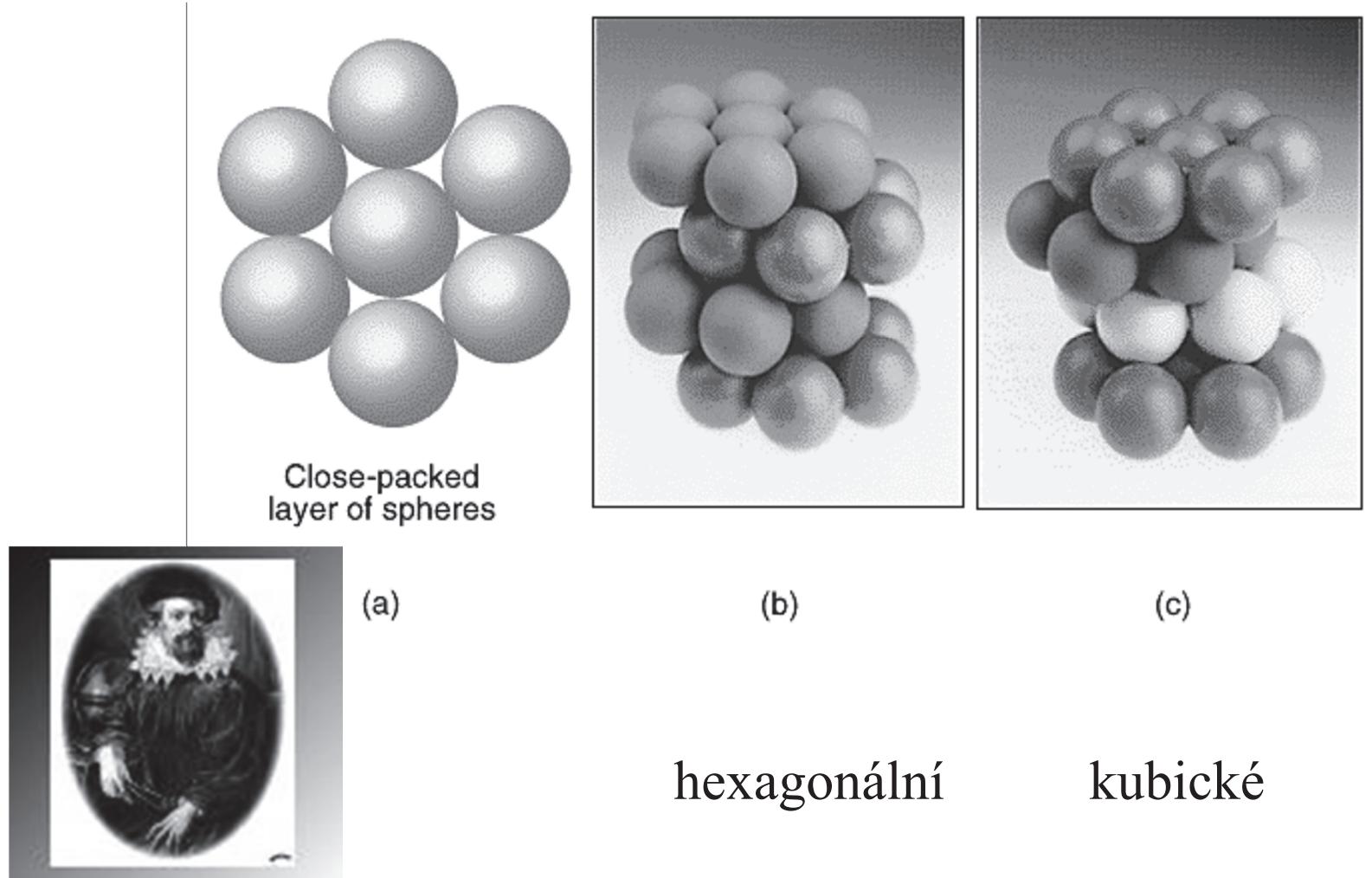
Side view



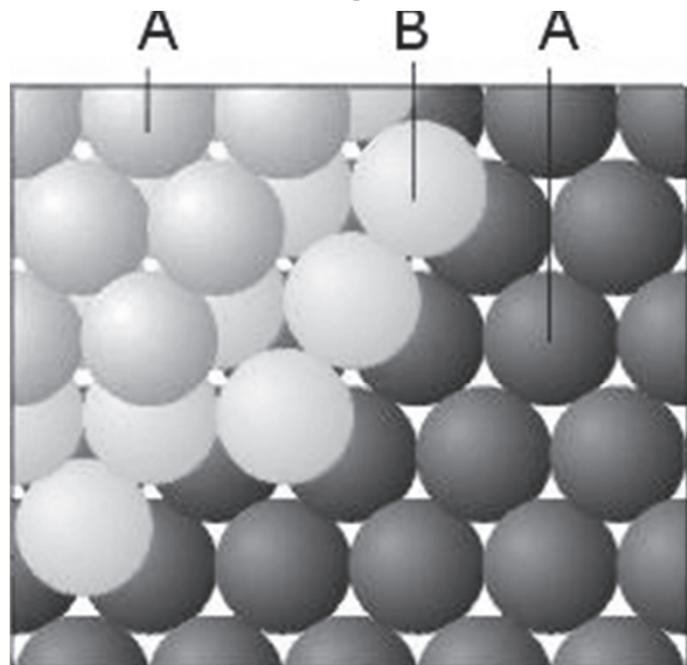
Cover  
octahedral  
holes in  
layer B

## kubické

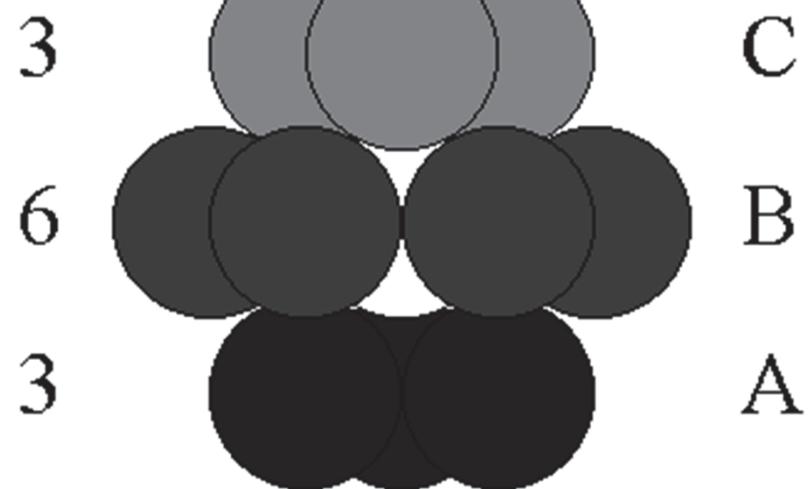
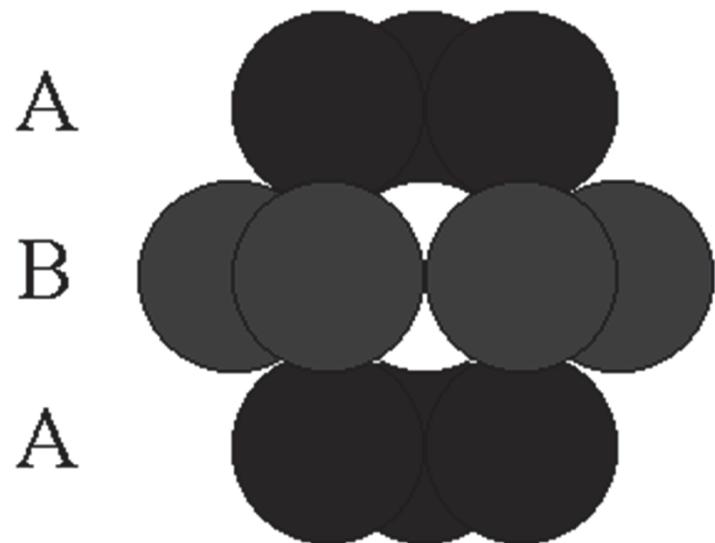
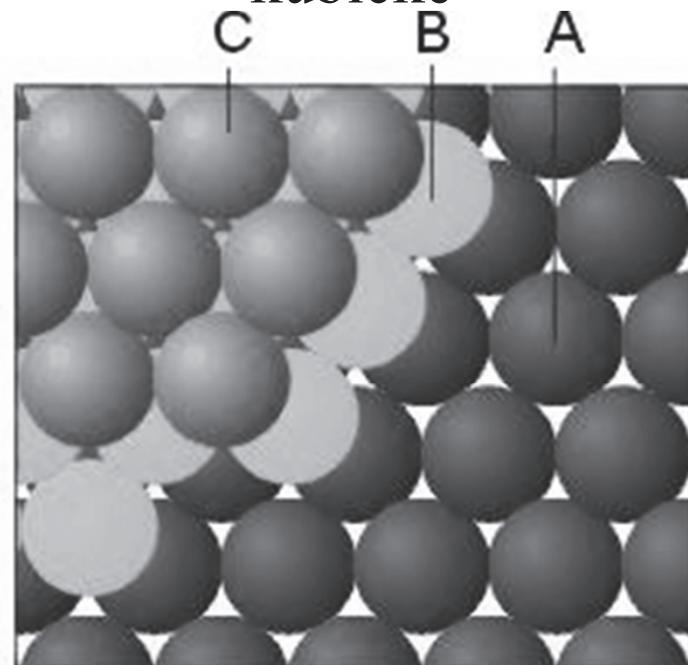
# Nejtěsnější uspořádání v prostoru



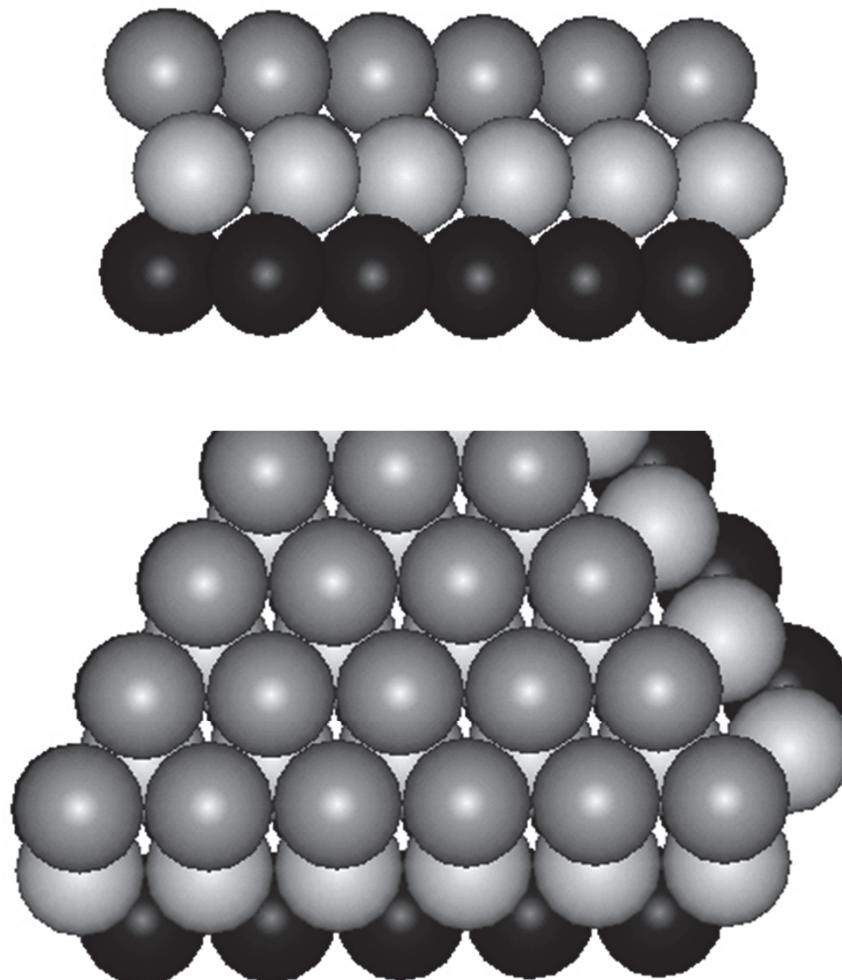
hexagonální



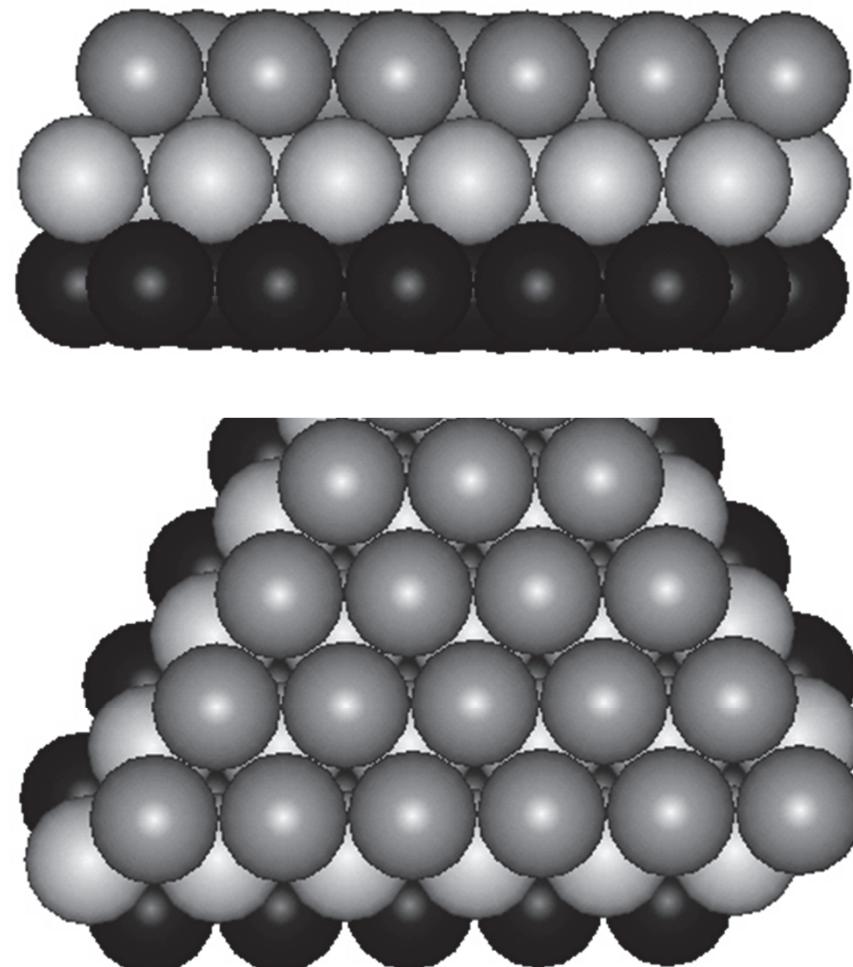
kubické



hexagonální



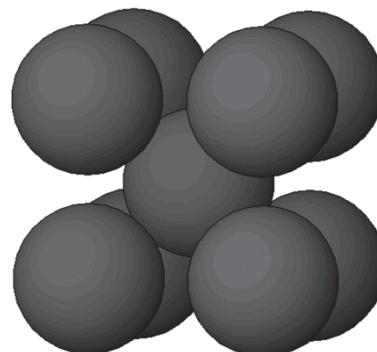
kubické



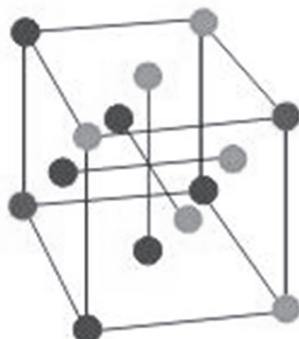
**Mg, Be, Zn, Ni, Li, Be, Os, He**



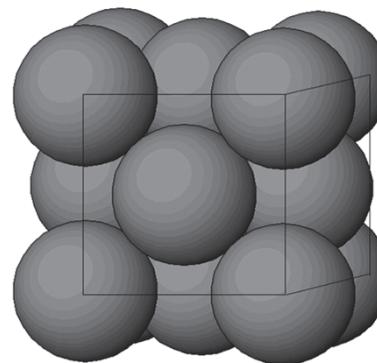
(a)



hexagonální



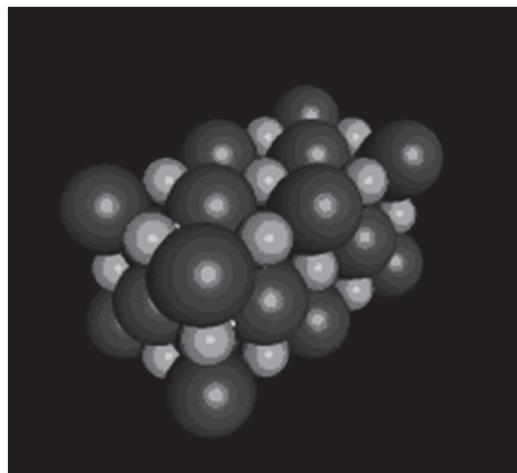
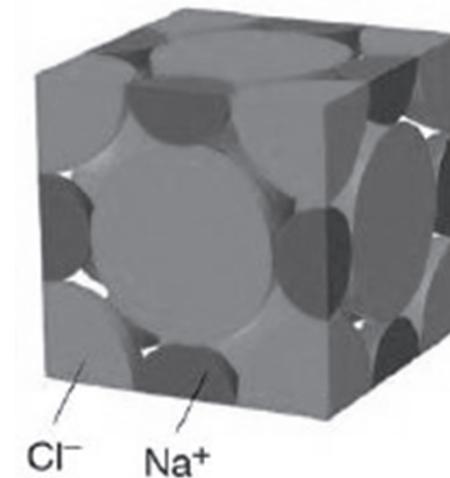
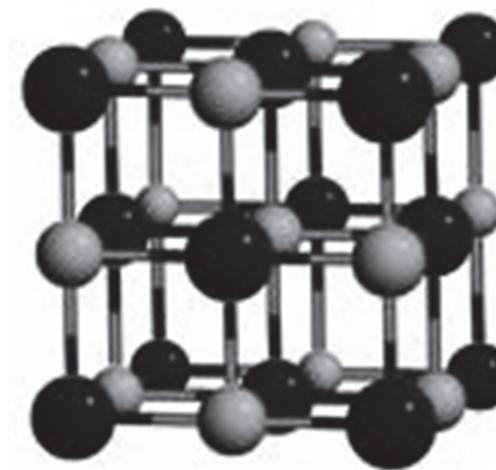
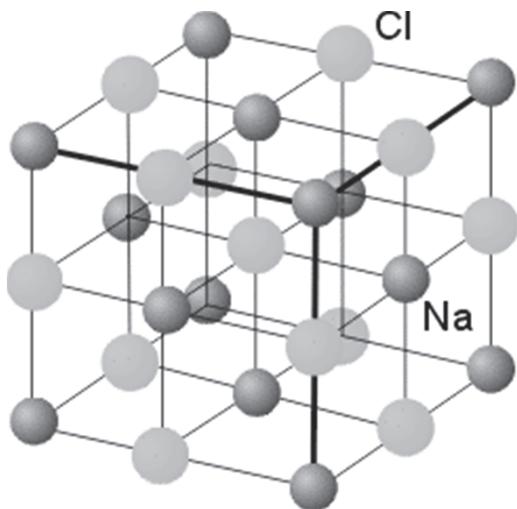
(b)



kubické

**Cu, Ca, Sr, Ag, Au, Ar, F<sub>2</sub>, C<sub>60</sub>,  
opal (300 nm)**

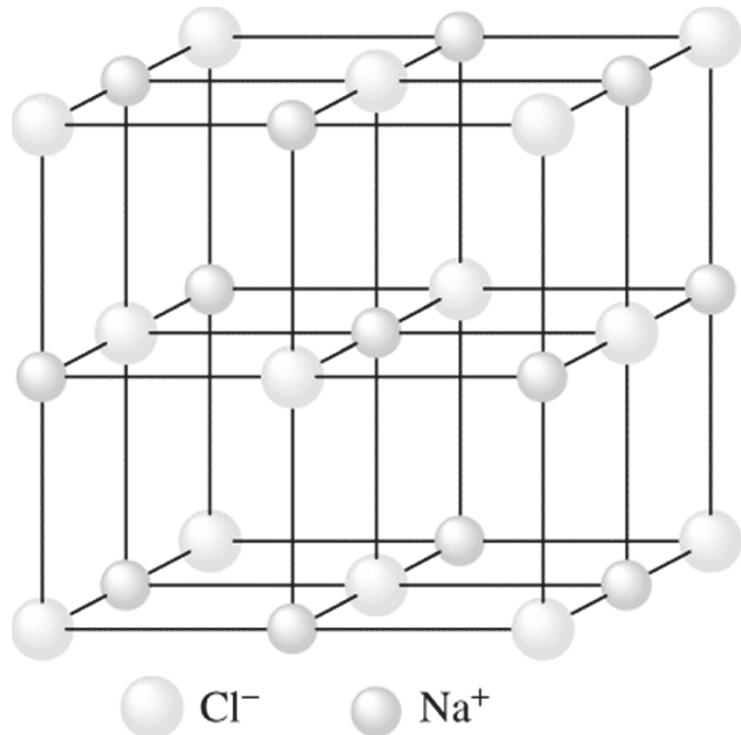
## Chlorid sodný, NaCl



$$Z = ?$$

Nejtěsnější kubické uspořádání Cl,  
Na obsazuje oktaedrické mezery

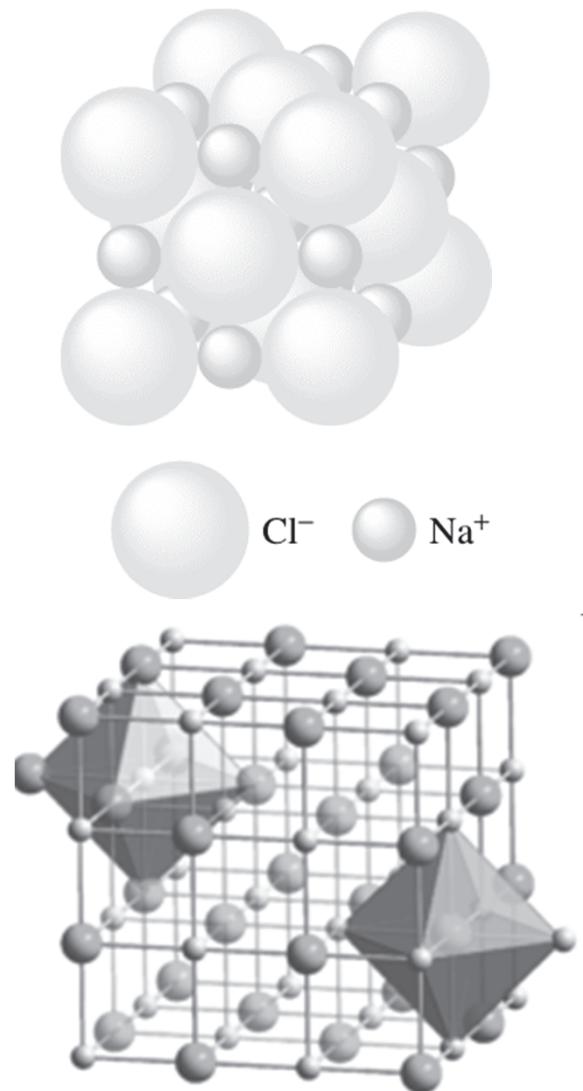
# Chlorid sodný, NaCl

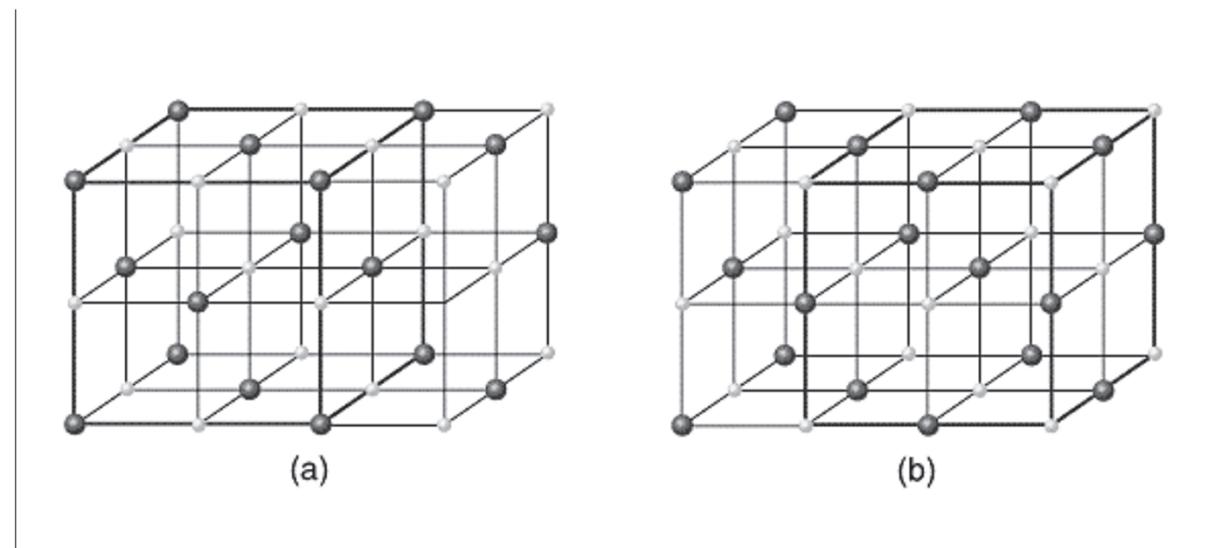
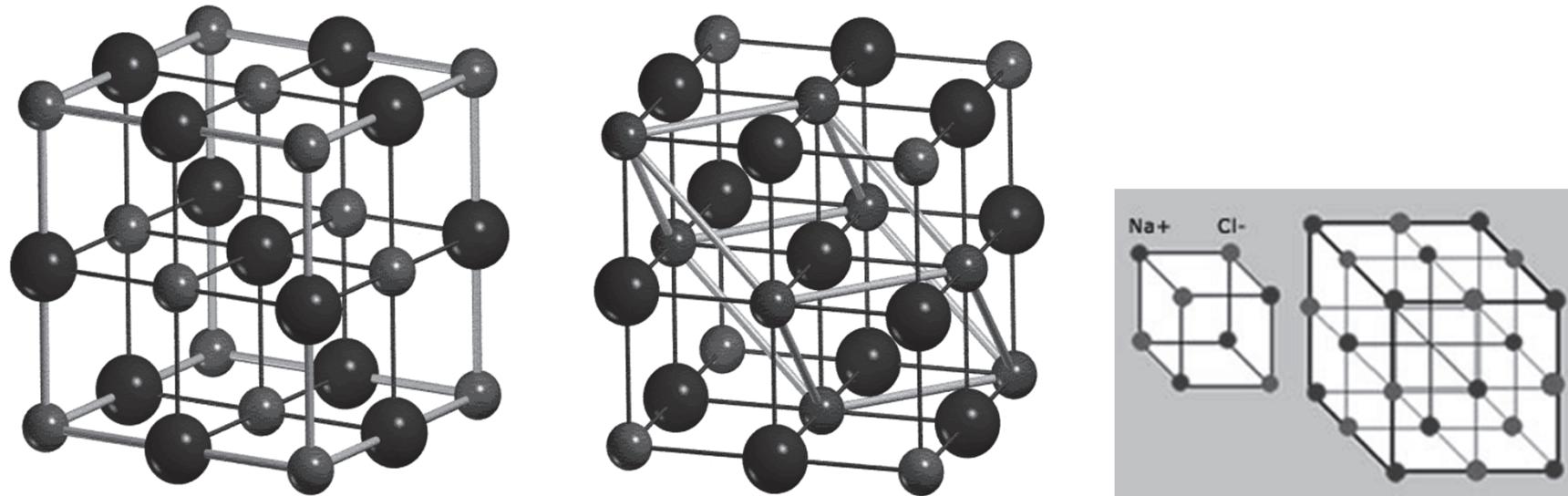


Koordinační číslo:

$\text{Na} = 6$

$\text{Cl} = 6$

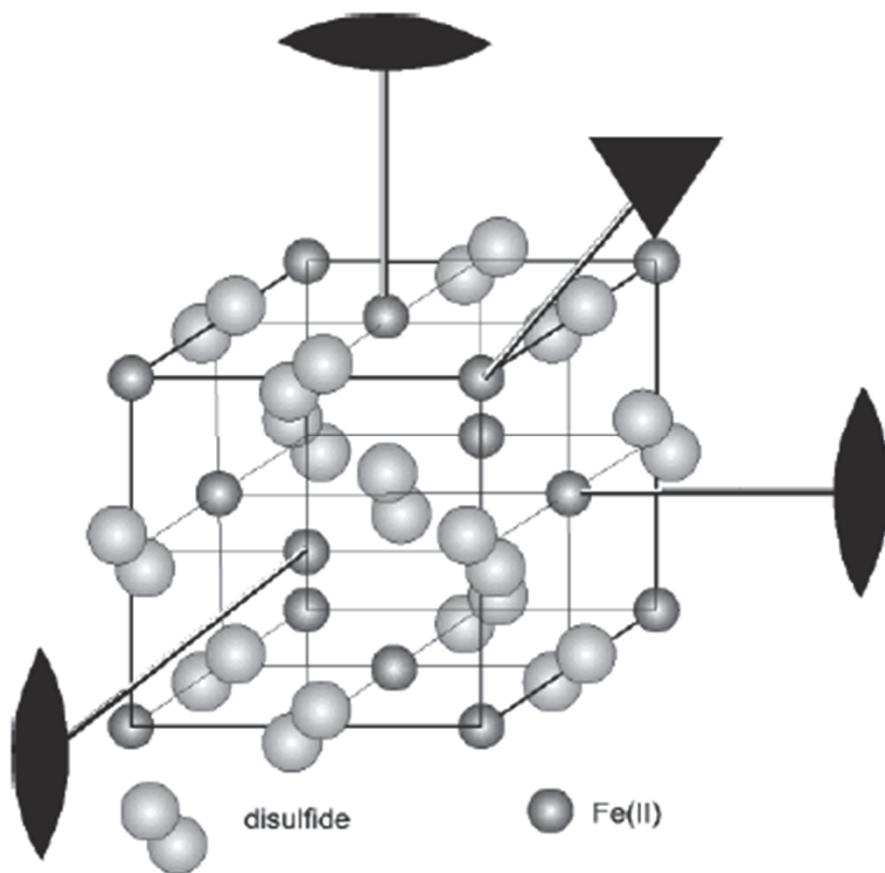
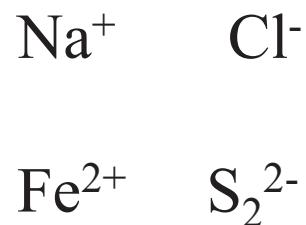




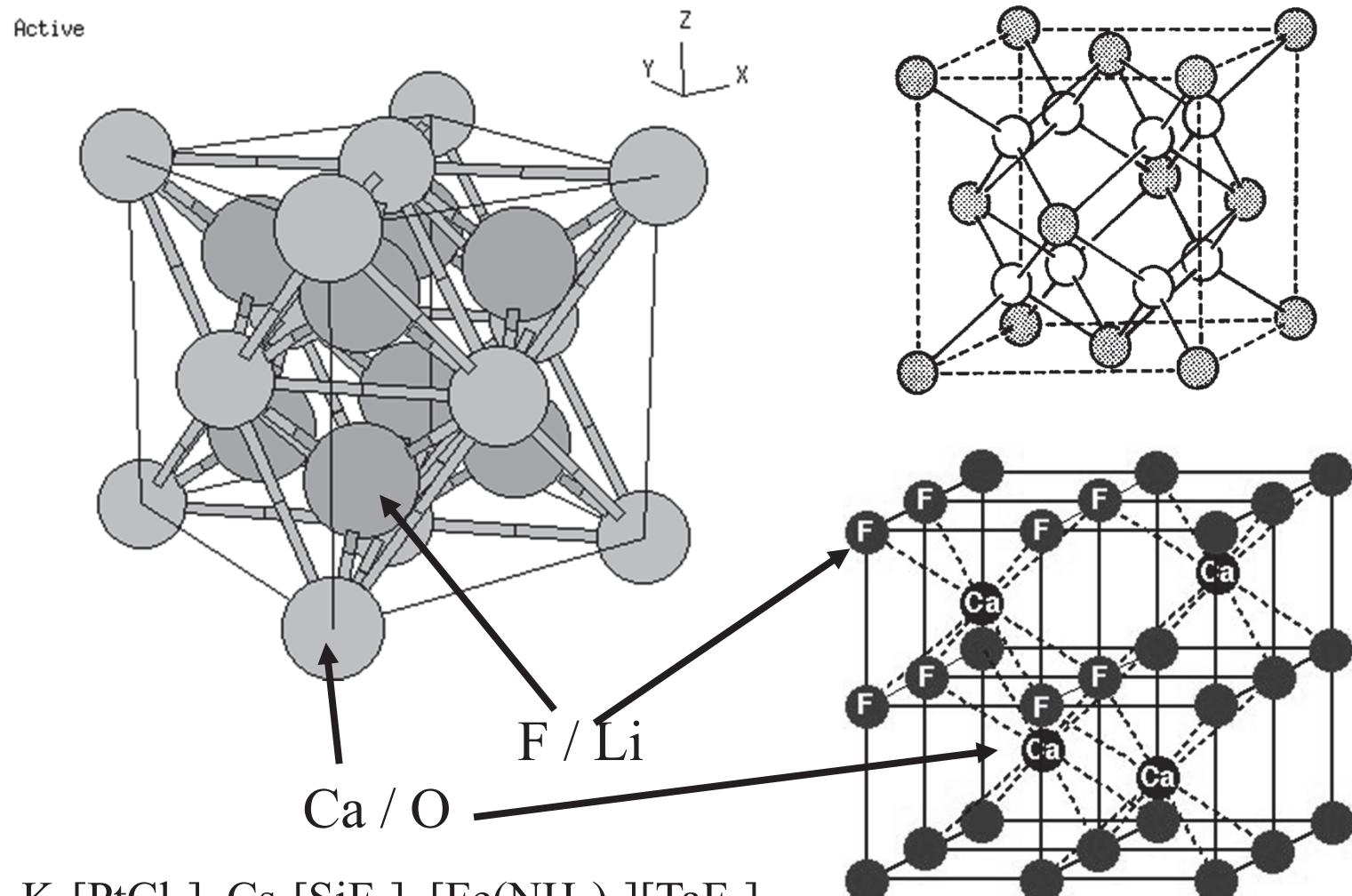
Dvě stejné nejtěsněji uspořádané kubické mřížky kationtů a aniontů

## Struktura pyritu - FeS<sub>2</sub>

Odvození složitějších struktur od jednoduchých strukturních typů



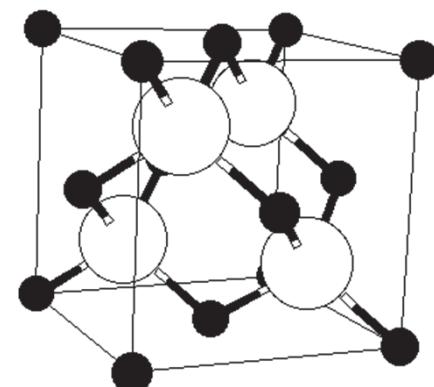
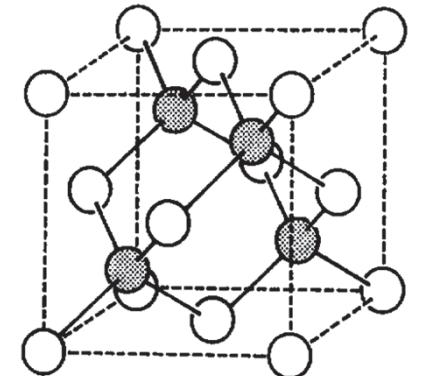
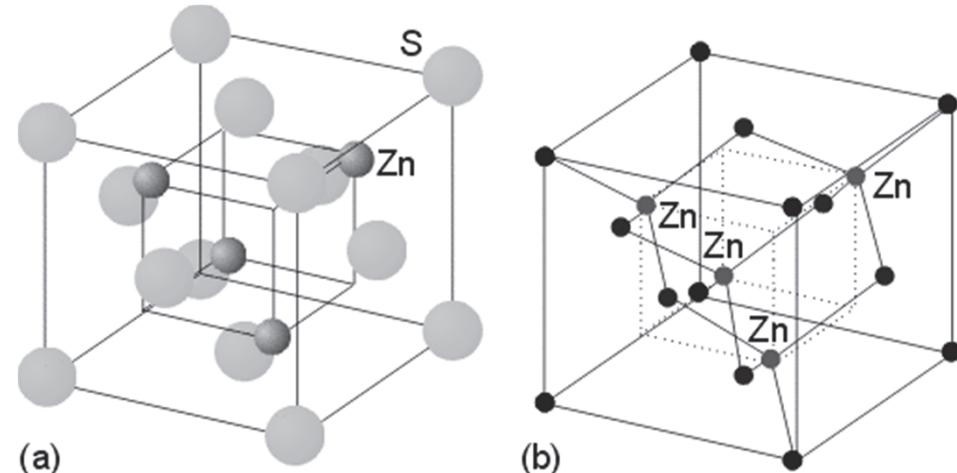
## Fluorit, $\text{CaF}_2$ (inverzní typ $\text{Li}_2\text{O}$ )

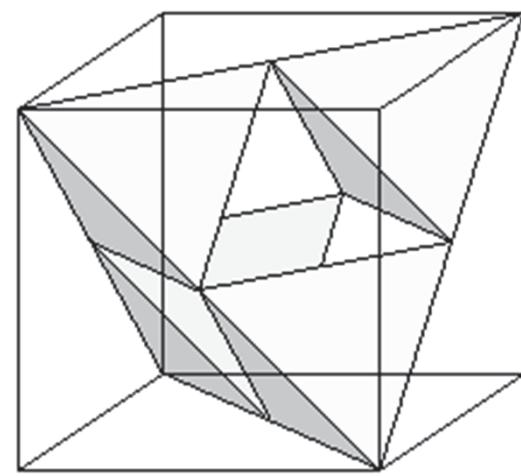
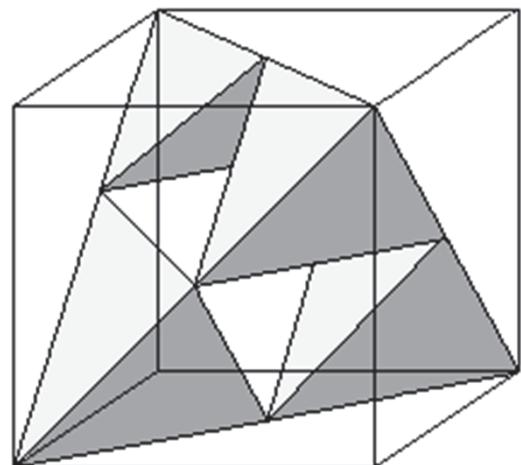


## Sfalerit, ZnS

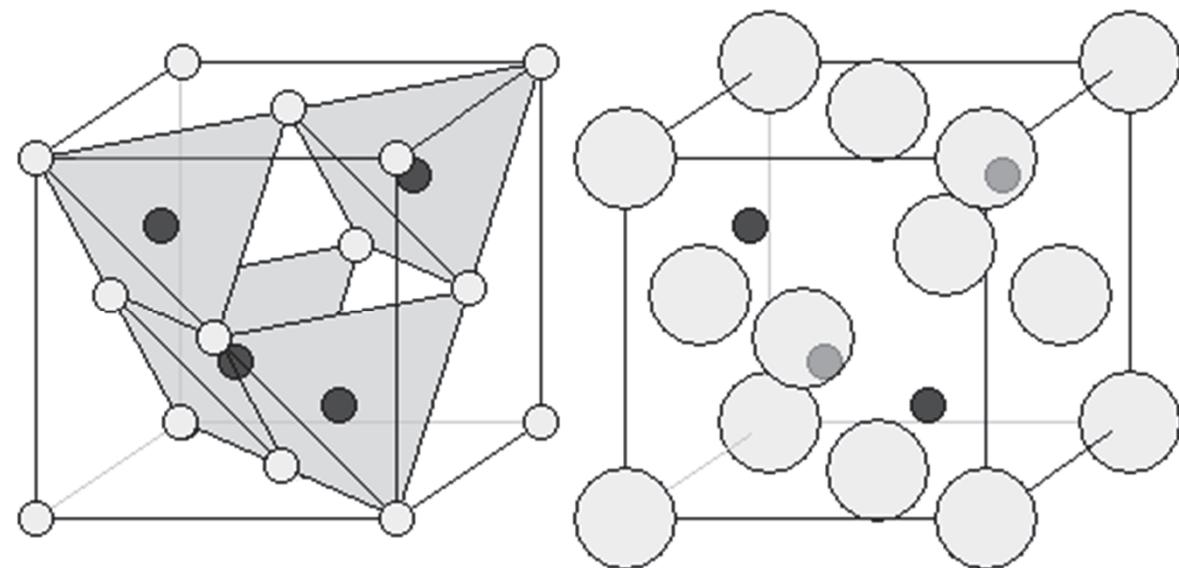
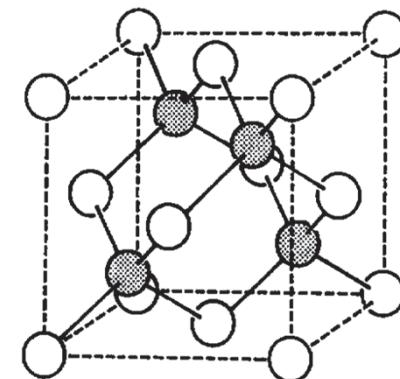
**Nejtěsnější kubické uspořádání S  
Zn obsazuje  $\frac{1}{2}$  tetraedrických mezer**

**Nejtěsnější kubické uspořádání Zn  
S obsazuje  $\frac{1}{2}$  tetraedrických mezer**



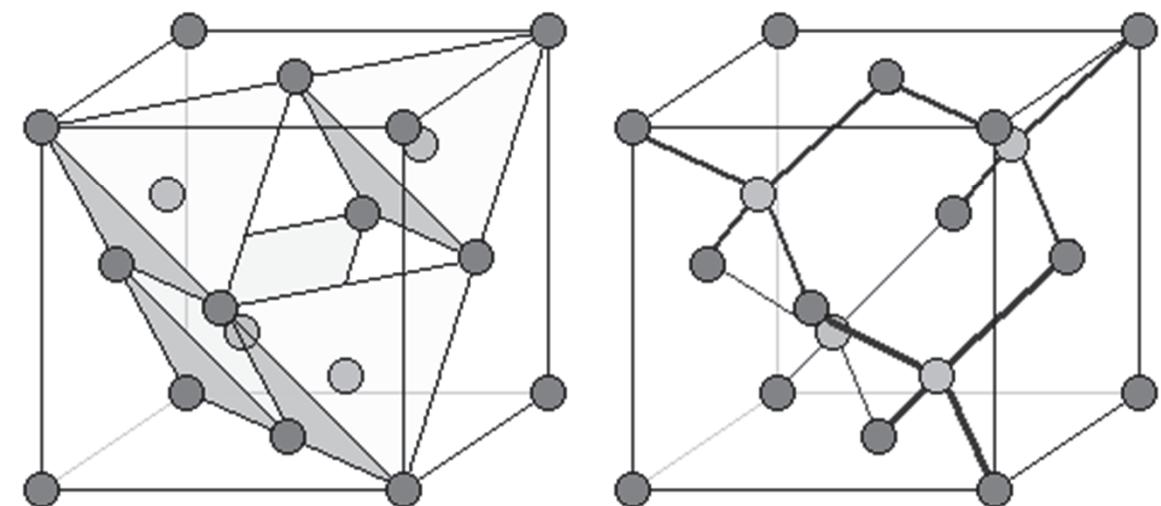
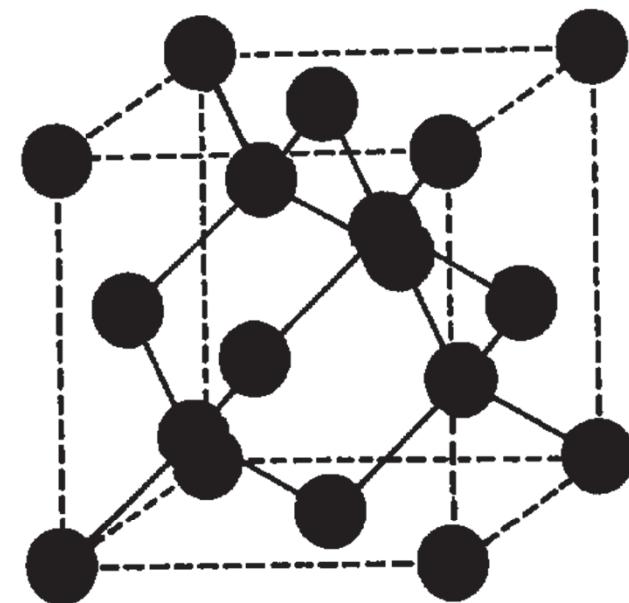
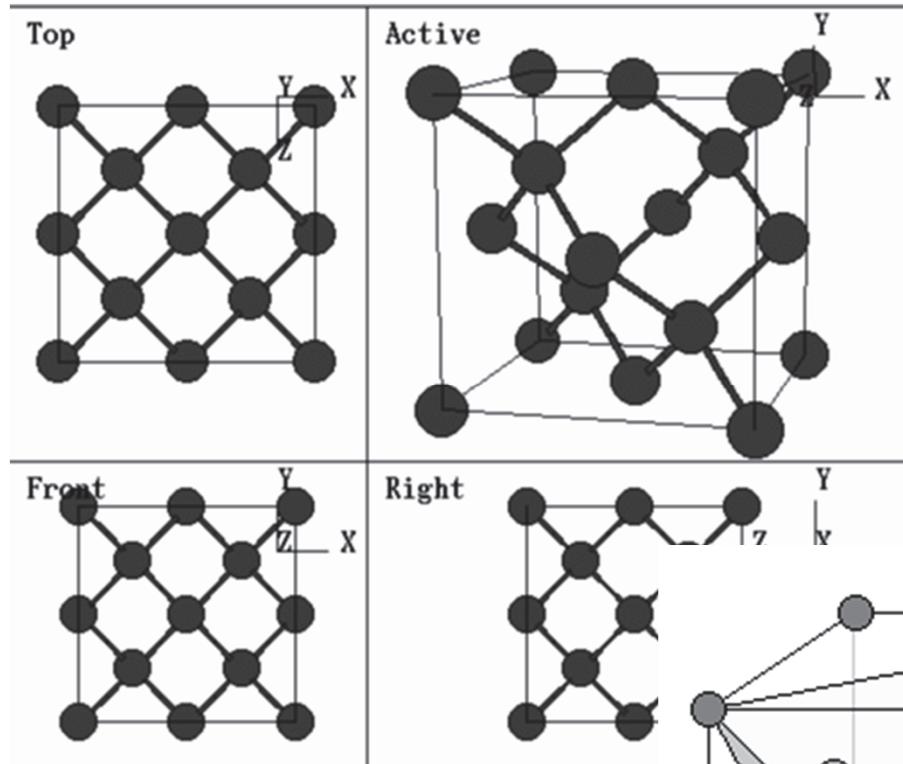


**Sfalerit, ZnS**



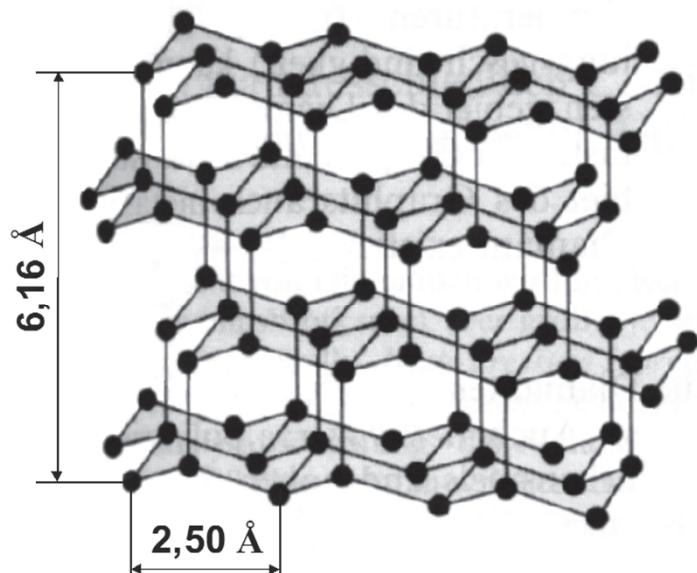
**Sphalerite ZnS**

# Diamant, C

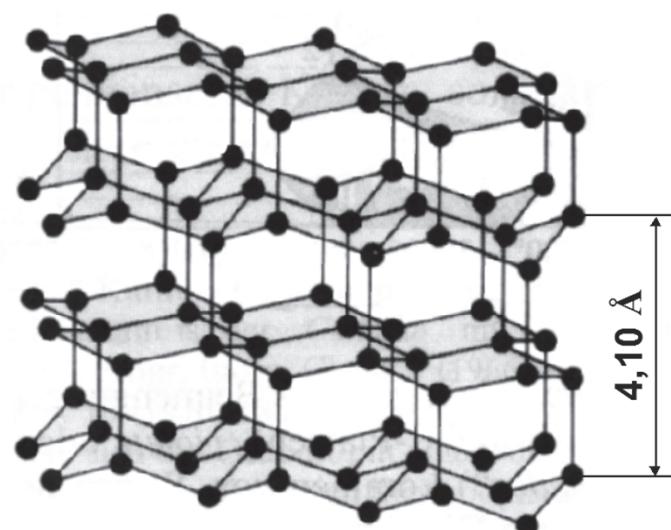


# Diamant, C

kubický



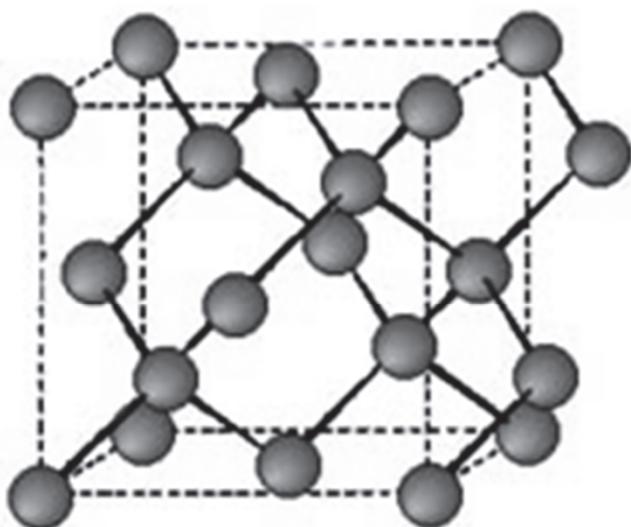
hexagonální  
lonsdaleite



$\text{SiO}_2$  kristobalit

$\text{SiO}_2$  tridymit  
led

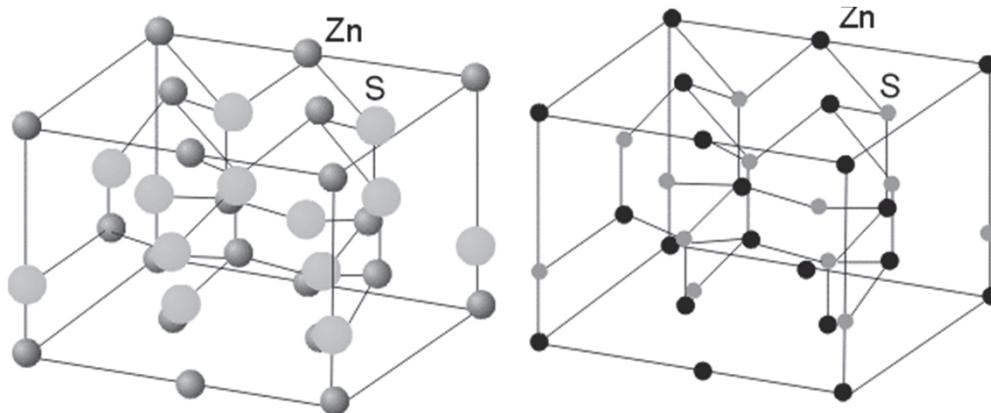
## Struktura prvků 14. skupiny



	$a$ (Å)	$d$ (g.cm $^{-3}$ )
C	3.566	3.515
Si	5.431	2.329
Ge	5.657	5.323
a-Sn	6.489	7.285

Stejná struktura – velikost buňky roste směrem dolů ve skupině

## Wurzit, ZnS



Nejtěsnější hexagonální  
uspořádání S  
Zn obsahuje  
 $\frac{1}{2}$  tetraedrických mezer

Polymorfie ZnS

