Review

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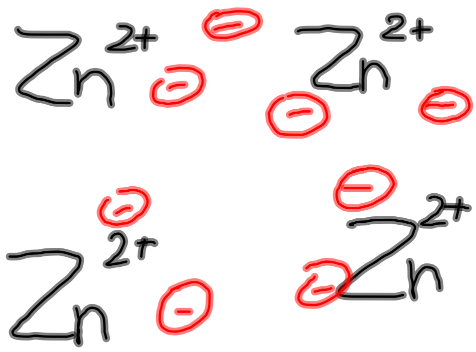
Ionic Crystals - packing

Metallic bonding - cations
'sea of electrons'

Packing arrangements
Body-Centered Cubic
Face-Centered Cubic
Hexagonal Close-Packed


Zn^{2+}
Zn^{2+}
Zn^{2+}
Zn^{2+}

Alloys

Alloys
Mixtures of two or more elements, at least one of which is a metal.

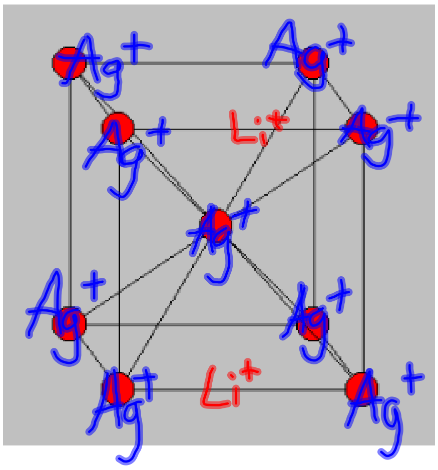
Table 7.3

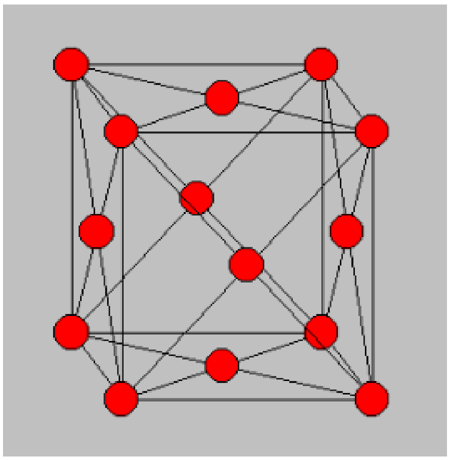
Table 7.3 Composition of Some Common Alloys

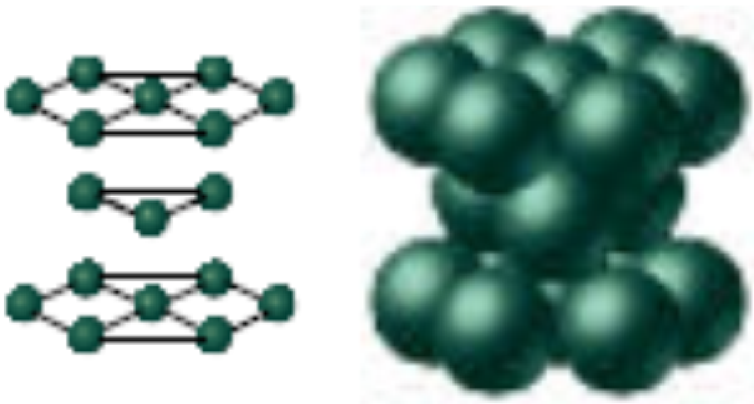
Name	Composition (by mass)
Sterling silver	Ag 92.5% Cu 7.5%
Cast iron	Fe 96% C 4%
Stainless steel	Fe 80.6% Cr 18.0% C 0.4% Ni 1.0%
Spring steel	Fe 98.6% Cr 1.0% C 0.4%
Surgical steel	Fe 67% Cr 18% Ni 12% Mo 3%

Form in one of two ways:
1) Substitutional Alloys
If atoms of the alloy are about the same size, they can replace each other in the crystal.

2) Interstitial Alloys
If atomic sizes are quite different, smaller atoms can fit into the spaces between the larger atoms.







Hexagonal close-packed

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Electronegativity

Electronegativity
The ability of an atom in a compound to attract electrons

Trends
- Within a group, electronegativity decreases from top to bottom
- Within a period, electronegativity increases from left to right

Ex. F

Table 6.2

Electronegativity Values for Selected Elements

H 2.1						
Li 1.0	Be 1.5	B 2.0	C 2.5	N 3.0	O 3.5	F 4.0
Na 0.9	Mg 1.2	Al 1.5	Si 1.8	P 2.1	S 2.5	Cl 3.0
K 0.8	Ca 1.0	Ga 1.6	Ge 1.8	As 2.0	Se 2.4	Br 2.8
Rb 0.8	Sr 1.0	In 1.7	Sn 1.8	Sb 1.9	Te 2.1	I 2.5
Cs 0.7	Ba 0.9	Tl 1.8	Pb 1.9	Bi 1.9		

Covalent Bond

Recall that a **covalent bond** is a shared pair of electrons between two nonmetal atoms.

- Electrons are attracted to the positive nuclei
- Each atom wants to reach the electron configuration of a noble gas (ns^2np^6 - Octet Rule)

Single Covalent Bond

Two atoms held together by sharing a pair of electrons

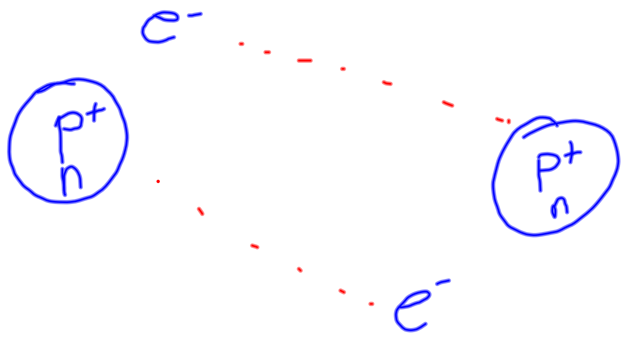
Molecular Formula H_2

Electron Dot Structure

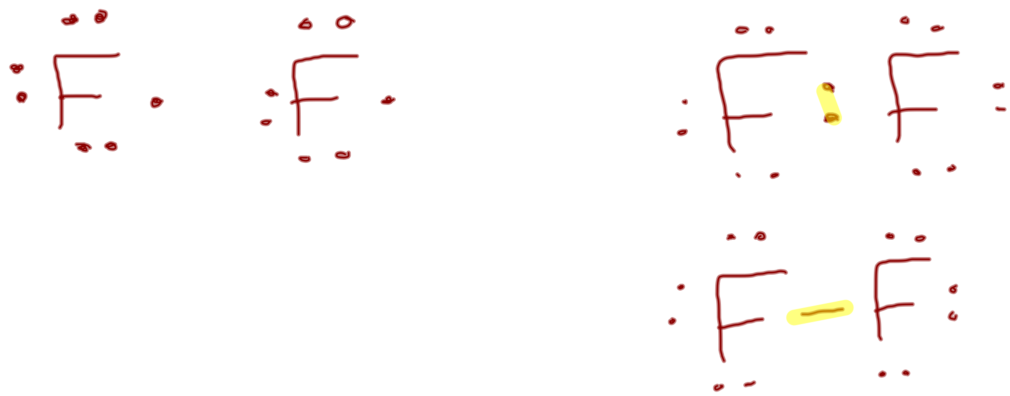
H· H·   H:H   H:H

Structural Formula

H—H


e⁻
p+
n
p+
n
e⁻

F_2



Lone pair (unshared pair)

A pair of valence electrons not shared between atoms