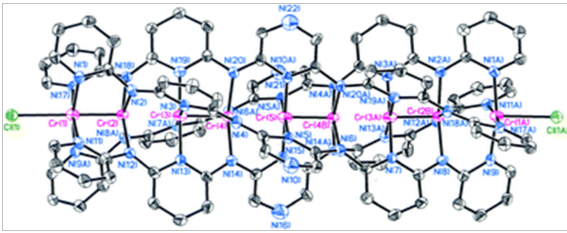


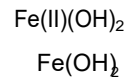
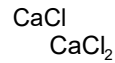
5.4 Metallic Bonds



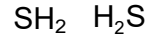
Oct 14-10:35 AM

1. Formula Review

What's wrong with the following?
Fix the errors!



Copper Nitrate
Copper (I) or (II) Nitrate

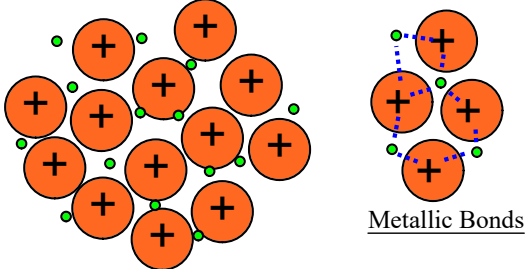


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Metals

'Electron Sea' Model - metal atoms have delocalized valence electrons that are free to move from atom to atom, leaving behind a positively charged metal center

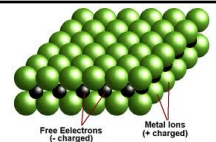
Metallic Bond - attraction of metal centers to delocalized electrons.



Nov 1-9:18 PM

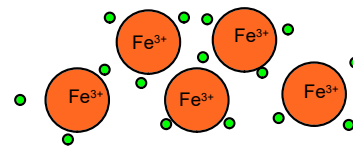
Metal Structure

Form lattices - a repeating structure between atoms.



The valence electrons a metal center can have equals its maximum charge (use your ions list).

Ex. Iron has a +3 ion, so it can have 3 valence electrons.



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Properties of Metals

Delocalized electrons act as a lubricant, letting metal centers to slide past each other when force is applied.

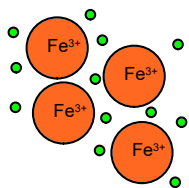
Metals are:

Malleable - can be hammered flat,

Durable - will bend without breaking,

Ductile - can be drawn into wire.

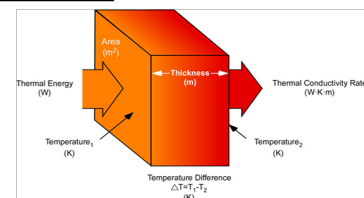
Draw plate for making wire.



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More Properties

Thermally conductive - transfer heat well



Electrically conductive - delocalized electrons move when electric potential (voltage) applied.

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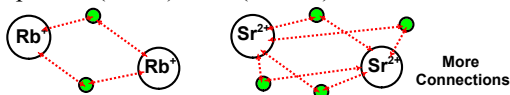
Melting & Boiling Points

Generally, metals have relatively high melting and boiling temperatures.

The more valence electrons a metal has, the higher the temperature: electrons in metallic bonds are attracted to metal centers (like little grappling hooks).

The more bonds there are, the more energy is needed to break them.

Example: Rb (312 C) vs Sr (1050 C).

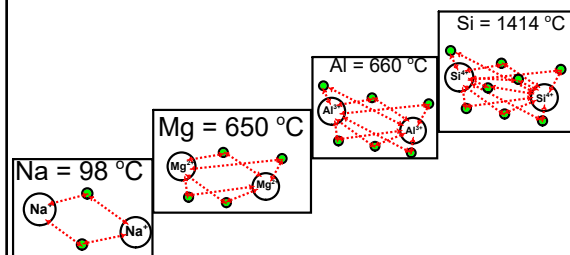


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2. Melting Point Example

Order these elements by increasing melting point:

Si Na Al Mg



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Alloys

Metals form alloys – mixtures of elements with metallic properties.



Brass:
Cu and Zn



Bronze Statue:
Cu and Sn



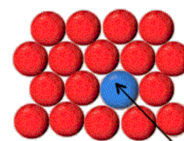
Steel: Fe and C
with other metals

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Types of Alloys

Substitutional – Some metal atoms replaced with atoms of similar size.

Example: Sterling silver → Silver (92%) mixed with Copper (8%).



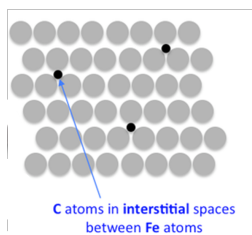
Substitutional Atom

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Types of alloys

Interstitial – small holes in a lattice filled with small atoms.

Example = carbon steel. Carbon fits between iron atoms.



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3. More Formula Review

What's wrong with the following?
Fix the errors!

Sodium (I) Chloride	Sodium Chloride
$\text{Ca}_3\text{PO}_{4(2)}$	$\text{Ca}_3(\text{PO}_4)_2$
NH_4OH	NH_4OH
$(\text{Na})_3\text{PO}_4$	Na_3PO_4
BaPO_4	$\text{Ba}_3(\text{PO}_4)_2$

Homework

5.4 Problems in your Booklet
Essential Skill 5.2 - Naming Compounds 2 (P. 73)
Due: Next Class
Unit 5 Test Soon

Oct 6-6:47 AM