6.2

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6.2: Naming and Classifying the Elements

- The names of the elements come from a variety of origins
- Some are named for their special properties, like phosphous = "light giving" and "water forming" = hydrogen
- Many of the elements are named to honour scientists, like einsteinium, Countries, like germanium, or cities, like berkelium.
- Most of the ancient elements were given Latin names, like plumbum for lead and ferrum for iron – Fe – Pb
- The symbolic naming system we see for the elements today was invented in order to make discussing elements among scientists easier and more precise. The system that was developed is considered to be an international language, one that is understood among scientists worldwide.

Symbols

- In the early 1800s, Swedish chemist Berzelius began developing strategies to cope with the necessity of naming and creating symbols for the elements
- He began by suggesting a symbolic system to describe the elements that would use the letters of either their common name of their Latin name
- His rules included:
  - Every element would be represented by the 1ST letter of their name, which would be CAPITALIZED

I = iodine

- Elements that were identified first would use the first letter of their Latin names. Elements discovered later would use the first letter of their common names...
- When a letter was previously used, a letter from the rest of the name would be added
- The 2nd letter added would always be lower case
- If you look at table 1 on page 188 you will see some elements that do not follow the rules exactly → Cl = chlorine

- Although having a symbol for each element was a great accomplishment, Berzelius considered the second part of his system to be the most important: that the ratio of elements in a compound were always small whole numbers
- Berzelius stated that every compound could be identified by a formula that shows the elements and the proportions they exist in when in a compound
- For example: H_2O = 2 "H" : 1 "O"
- EX: Carbon dioxide = CO_2 → 1 "C" : 2 "O"

$MgCl_2$ → 1 "Mg" : 2 "Cl"

Classifying Elements

- We already know that all elements are different from each other
- Most elements have unique properties which are known, and that can be used to help us identify them
- Some elements have similar chem. and physical properties, and are often grouped together for this reason. This also helps chemists predict how they might react

- **Metals**
  - Most of the elements that were discovered 1ST were metals
  - Alchemists wanted to find ways to convert inexpensive metals into gold
  - Most of the elements known to us today are metals, and they all have a wide range of physical and chemical properties
  - Most metals have the properties listed below:

Property	Characteristic
Lustre	Yes! Shiny
Malleability	Yes!
Ductility	Yes!
Conductivity	Good conductors (Liz)
State	Solid @ Room. Temp. Exception: Mercury
Density	denser than non-metals
Reactivity	Most react w/ acid Some are very reactive (water/air)

- Some examples of metals are:

- **Non-Metals**
  - The elements that do not have the characteristics of metals are generally classified as non-metals.
  - Most non-metals have the properties listed below:

Property	Characteristic
Lustre	NO! dull (--)

Malleability	No! brittle solids
Melting and boiling pt	low BP/MP than metals.
Conductivity	Poor conductors
State	Gases @ RTemp. Except: Bromine (L) Sulfur (solid)

- Some examples of non-metals are:

  - Metalloids
    - A few elements do not fit in exclusively with either group, and fall into their own category called metalloids
    - They generally have a few properties of metals, and a few of non-metals
    - Example: Silicon shiny/solid, poor conductor, brittle
    - Many metalloids are semi-conductors of electricity, and there is a full range from partial to full conductivity, making them important to our expanding electronics world.
    - The metalloids are: B, Si, Ge, As, Te, Sb, Po, At

DO: CYUs p. 192 ~~# 1, 2, 3, 4, 6, 7, 8, 11, 12, 13, 15, 16~~

#3, 7