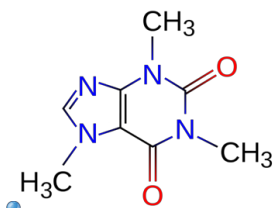


2.4 – Elements and Compounds



Caffeine

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Warning! Separation Lab Tomorrow.
Bring your long pants and close toed shoes!!

Elements Song URL (If needed)

<https://www.youtube.com/watch?v=zGM-wSKFBpo>

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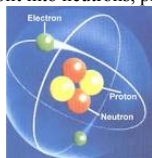
Elements

Basic building blocks of matter. 92 naturally occurring and many man-made.

They all have unique names and symbols.

Smallest representative of an element is the atom – Greek word: “Unable to be cut.”

Not true, they can be split into neutrons, protons, and electrons.

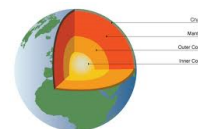


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Element Factsoids

Unequal distribution in the universe and on Earth. Hydrogen is estimated to make up about 75% of the mass of the universe.

On Earth, oxygen and silicon make up about 75% of the crust’s mass.

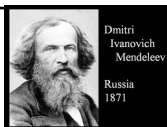


Oxygen, carbon, and hydrogen make up about 90% of our mass.

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Periodic Table

Dmitry Mendeleev in 1869 pioneered in organizing the 63 known elements.



Grp	Grp I	Grp II	Grp III	Grp IV	Grp V	Grp VI	Grp VII	Grp VIII
At. No.	Li=7	Be=9, 4	B=11	C=12	N=14	O=16	F=19	
2	Na=23	Mg=24	Al=27, 5	Si=28	P=31	S=32	Cl=35, 5	
4	K=39	Ca=40	Sc=44	Ti=48	V=51	Cr=52	Mn=55	Fe=56, Co=59, Ni=59, Cu=63, Zn=65
5	(Ca=63)	Zn=65	Y=88	Zr=90	Nb=94	Mo=96	Tc=98	Ru=101, Rh=101, Pd=106, Ag=108
6	Rb=85	Sr=87	Yt=88	Zr=90	Nb=94	Mo=96	Tc=98	Ru=101, Rh=101, Pd=106, Ag=108
7	(Ag=108)	Cl=112	In=113	Sn=118	Sb=122	Te=128	I=127	
8	Cs=133	Ba=137	Pb=140	Tl=140	Pb=140	Bi=208	Po=209	
9	(-)	(-)	(-)	(-)	(-)	(-)	(-)	
10	(-)	(-)	(-)	(-)	(-)	(-)	(-)	
11	(As=197)	Hg=200	Tl=204	Pb=207	Bi=208	Po=209	At=210	
12	(-)	(-)	(-)	(-)	(-)	(-)	(-)	

He classified them by similarities in properties. His horizontal rows are called periods, columns are called groups (or families).

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Compounds

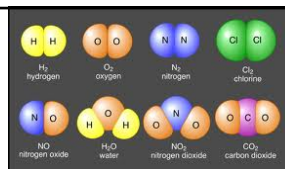
Made of two or more chemically combined different elements.

10 million known compounds.

New ones are discovered or developed at the rate of nearly 100,000 / year.

Compounds have different physical and chemical properties than their elements.

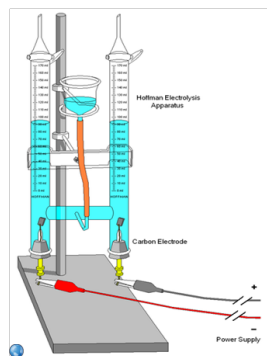
Compounds can be separated into elements different ways.



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Electrolysis

Running electric current through some compounds causes them to separate into their elements.



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Law of Definite Proportions

A compound is composed of the same elements in the same proportions by mass regardless of the sample size.

% mass: ratio of an element's mass to the total mass of a compound.

$$\% \text{ mass} = \frac{\text{Mass of Element}}{\text{Mass of Compound}} \cdot 100\%$$

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Example

A 78.0 g sample of unknown compound contains 12.4 g H. What is the percent by mass of hydrogen?

$$\% \text{ mass} = \frac{\text{Mass of Element}}{\text{Mass of Compound}} \cdot 100\%$$

$$\% \text{ mass} = \frac{12.4 \text{ g}}{78.0 \text{ g}} \cdot 100\% = 15.9\%$$

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Law of Multiple Proportions

Different compounds form when the same elements combine in different ratios of small whole numbers.

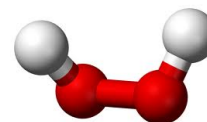
Example: Water (H_2O) and Hydrogen Peroxide (H_2O_2).

Comparing the two compounds, the ratio of hydrogen to oxygen in water is 2:1.

In hydrogen peroxide, the ratio is 2:2 (or 1:1).



Water



Hydrogen Peroxide

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Homework

2.4 Problems in your Booklet

Due: Next Class!



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