

Announcements

- Read Chapter 3, Wiley Chapter 3 problems due Wed., Sept. 26th @ 11AM

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Today's topics

- Compounds
 - Molecular and ionic
 - Naming compounds

Atoms and electrons

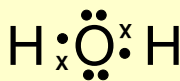
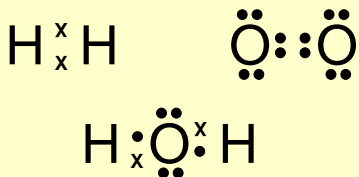
H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac	Rf	Ha	Sg	Ns	Mt										

Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

Main group

Reactivity – a key of chemistry

- Everything wants to be noble
- Atoms react through the electrons
 - Sharing e⁻ makes neutral molecules



Many non-metal elements form diatomic molecules

H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac	Rf	Ha	Sg	Ns	Mt										

- H₂
- N₂
- O₂
- F₂
- Cl₂
- Br₂
- I₂
- C_x
- S₈
- P₄
- Se_x where x=4-1000!

Note: Noble gases do not form diatomics

(They don't form any compounds!)

Naming binary* molecular compounds

- Count (in Greek), name & change ending

ex: Name N₂O₄

dinitrogen tetraoxide

ex: give the formula for

dichlorine heptaoxide

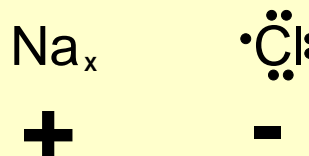


mono = 1 (often omitted)
 di = 2
 tri = 3
 tetra = 4
 penta = 5
 hexa = 6
 hepta = 7
 octa = 8
 nona = 9
 deca = 10

*Binary means two elements. Different than diatomic which is two atoms.

Reactivity – a key of chemistry

- Everything wants to be noble
- Atoms react through the electrons
 - Transferring e⁻ makes ions



A sodium atom walks into a bar and says "I think I just lost an electron."
 Bartender: "Are you sure?"
 Sodium atom: "Yes, I'm POSITIVE"

The proper class response: uncontrolled laughter, turned to sobbing with such a beautiful & meaningful story.

How to distinguish ions?

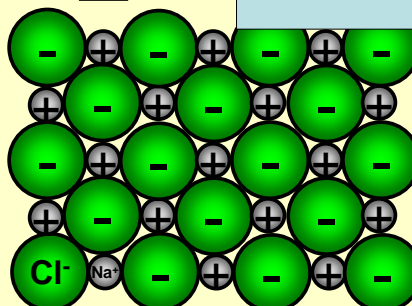
- Physically
 - falls apart in water & conducts
 - falls apart upon melting & conducts
- Why do they conduct? -Must have a charge
 - Positive – cation (Metals form cations)
 - Negative – anion (Non-metals form anions)
- Ionic compounds are electrically neutral

Salt: macroscopic

- Why are salts brittle?
 - Ionic solids

Push down

Now hit the crystal



Naming ionic compounds

- Name the cation
 - Very simple: the element name
- Name the anion
 - Simple: drop the elements end & add -ide
- State the charge if needed
 - For non-main group elements state the charge in Roman numerals in parentheses

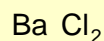
ex: name FeS
Iron (II) sulfide

ex: name Fe₂O₃
Iron (III) oxide

Writing formulas for ionic compounds

- Write cation symbol first
- Write the anion second
- Balance the charges by adding subscripts
- Reduce to lowest set of whole numbers

ex: Barium and chlorine react. Give the formula.



ex: Titanium and nitrogen react. Give formula.



Older method of naming ionic compounds: Stock system

- Transition metals with two or more oxidation states
 - Higher oxidation state ends in -ic
 - Lower oxidation state ends in -ous
- ex: FeCl₂ Ferrous chloride
FeCl₃ Ferric chloride
- CuO Cupric oxide
Cu₂O Cuprous oxide
- Need to know what oxidation states are possible
 - If in doubt consult MSDS or label

Many ionic compounds have waters of hydration

- Name the ionic compound
- Count the waters in Greek
- Add the word hydrate

mono = 1 (often omitted)
di = 2
tri = 3
tetra = 4
penta = 5
hexa = 6
hepta = 7
octa = 8
nona = 9
deca = 10

ex: Na₂S • 9 H₂O

Sodium sulfide nonahydrate