

## ARIS HW #3. Due - Next Friday!

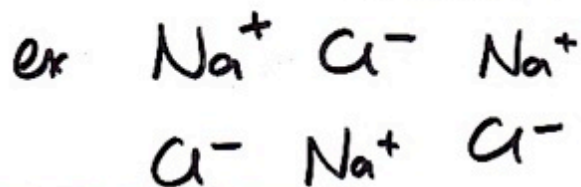
Exam 1: Ch 1 + 2

Website: chem1141.ssuchemistry.com

### Naming Compounds

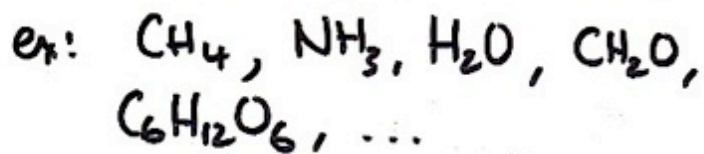
2 Main types of cpds: Ionic

- o Metal + Nonmetals
- o Cations + Anions.



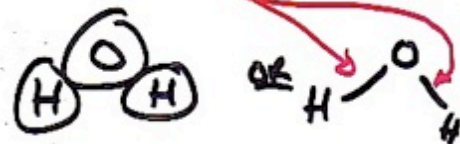
### Covalent/Molecular

o Non-metals (H = "non-metal")



Molecules: atoms are bonded together using a co-valent bond. Ch 9+10

ex: Water:  $\text{H}_2\text{O}$



### IONIC

Usually made from metals + non-metals  
(cations) (anions)

ex:  $\text{NaCl}$ ,  $\text{MgO}$ ,  $\text{Al}_2\text{O}_3$

Name: ① Cation name (+) ② Anion name (-)

ex: Cation-name

Usually just the element name!

ex:  $\text{Na}^+$  = sodium ||  $\text{Al}^{3+}$  = aluminum  
 $\text{Mg}^{2+}$  = magnesium

## Anion name

- Use element name, but remove ending + change to -ide.

ex:  $\text{Cl}^-$  chlorine ~~ide~~ ide

$\text{F}^-$  fluorine ~~ide~~ ide

$\text{O}^{2-}$  oxygen ~~ide~~ ide

$\text{N}^{3-}$  nitrogen ide

$\text{P}^{3-}$  phosphorus ~~ide~~ ide

#, ± } charges:  $3^-$   $\overset{\times}{-3}$   
Charge oxidation number.

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**Table 2.2** The “-ide” Nomenclature of Some Common Monatomic Anions According to Their Positions in the Periodic Table

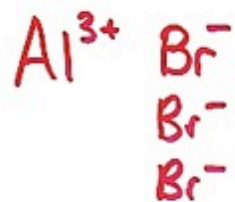
Group 4A	Group 5A	Group 6A	Group 7A
C Carbide ( $\text{C}^{4-}$ )*	N Nitride ( $\text{N}^{3-}$ )	O Oxide ( $\text{O}^{2-}$ )	F Fluoride ( $\text{F}^-$ )
Si Silicide ( $\text{Si}^{4-}$ )	P Phosphide ( $\text{P}^{3-}$ )	S Sulfide ( $\text{S}^{2-}$ )	Cl Chloride ( $\text{Cl}^-$ )
		Se Selenide ( $\text{Se}^{2-}$ )	Br Bromide ( $\text{Br}^-$ )
		Te Telluride ( $\text{Te}^{2-}$ )	I Iodide ( $\text{I}^-$ )

\*The word “carbide” is also used for the anion  $\text{C}_2^{2-}$ .

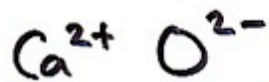
## Compounds



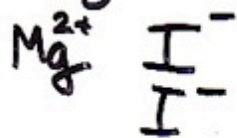
Metal + Non-metal  $\Rightarrow$  IONIC



Aluminum bromide



Calcium oxide



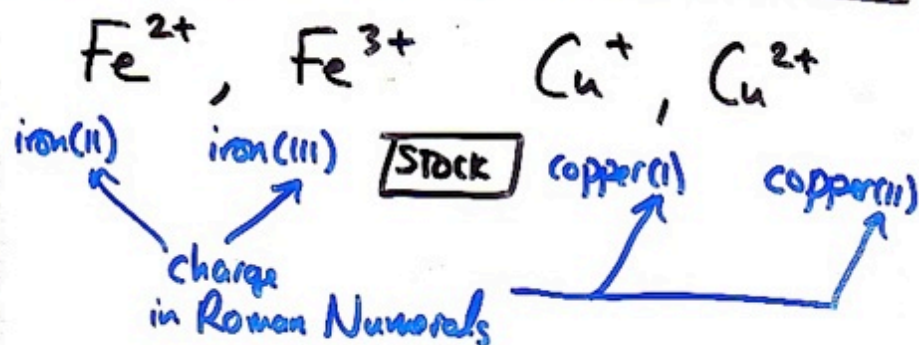
magnesium iodide

Some elements have  $>1$  possible charge!



iron chloride

iron chloride



**OLD**

- Use Latin element name.
- Lower charged ion ends in -ous
- higher charged ion, ends in -ic

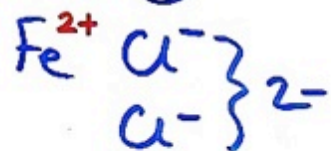
Iron = Ferrum

$\text{Fe}^{2+}$        $\text{Fe}^{3+}$   
ferrous      ferric

Copper = Cuprum

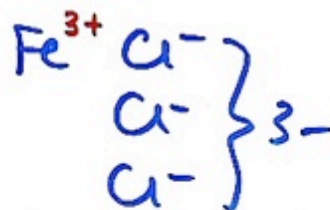
$\text{Cu}^+$        $\text{Cu}^{2+}$   
cuprous      cupric

$\text{FeCl}_2$



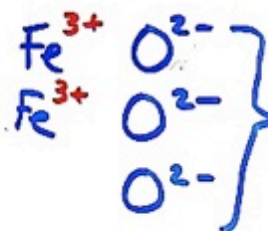
iron(II) chloride  
ferrous chloride

$\text{FeCl}_3$



iron(III) chloride  
ferric chloride

$\text{Fe}_2\text{O}_3$



iron(III) oxide

↑  
charge

ferric oxide

"rust"



ferrous wheel.

Polyatomic Ions

Monatomic ions:  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ...

Polyatomic ions:  $\text{NH}_4^+$ ,  $\text{SO}_4^{2-}$

## Common polyatomic ions

Flashcards.

$\text{NH}_4^+$  Ammonium.

$\text{OH}^-$  hydroxide

$\text{HCO}_3^-$  bicarbonate / hydrogencarbonate

$\text{NO}_3^-$  nitrate

$\text{NO}_2^-$  nitrite

$\text{CN}^-$  cyanide

$\text{C}_2\text{H}_3\text{O}_2^-$  or  $\text{CH}_3\text{CO}_2^-$  or  $\text{CH}_3\text{COO}^-$   
acetate

$\text{CO}_3^{2-}$  carbonate

$\text{SO}_4^{2-}$  sulfate

$\text{SO}_3^{2-}$  sulfite

$\text{PO}_4^{3-}$  phosphate

Normal  
-ate

$\text{SO}_4^{2-}$   
sulfate

$\text{NO}_3^-$   
nitrate

Missing  
an O  
-ite

$\text{SO}_3^{2-}$   
sulfite

$\text{NO}_2^-$   
nitrite

ex:  $\text{CO}_3^{2-}$   
carbonate

$\text{CO}_2^{2-}$   
carbonite

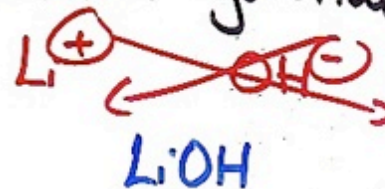
**Table 2.3** Names and Formulas of Some Common Inorganic Cations and Anions

Cation	Anion
aluminum ( $\text{Al}^{3+}$ )	bromide ( $\text{Br}^-$ )
ammonium ( $\text{NH}_4^+$ )	carbonate ( $\text{CO}_3^{2-}$ )
barium ( $\text{Ba}^{2+}$ )	chlorate ( $\text{ClO}_3^-$ )
cadmium ( $\text{Cd}^{2+}$ )	chloride ( $\text{Cl}^-$ )
calcium ( $\text{Ca}^{2+}$ )	chromate ( $\text{CrO}_4^{2-}$ )
cesium ( $\text{Cs}^+$ )	cyanide ( $\text{CN}^-$ )
chromium(III) or chromic ( $\text{Cr}^{3+}$ )	dichromate ( $\text{Cr}_2\text{O}_7^{2-}$ )
cobalt(II) or cobaltous ( $\text{Co}^{2+}$ )	dihydrogen phosphate ( $\text{H}_2\text{PO}_4^-$ )
copper(I) or cuprous ( $\text{Cu}^+$ )	fluoride ( $\text{F}^-$ )
copper(II) or cupric ( $\text{Cu}^{2+}$ )	hydride ( $\text{H}^-$ )
hydrogen ( $\text{H}^+$ )	hydrogen carbonate or bicarbonate ( $\text{HCO}_3^-$ )
iron(II) or ferrous ( $\text{Fe}^{2+}$ )	hydrogen phosphate ( $\text{HPO}_4^{2-}$ )
iron(III) or ferric ( $\text{Fe}^{3+}$ )	hydrogen sulfate or bisulfate ( $\text{HSO}_4^-$ )
lead(II) or plumbous ( $\text{Pb}^{2+}$ )	hydroxide ( $\text{OH}^-$ )
lithium ( $\text{Li}^+$ )	iodide ( $\text{I}^-$ )
magnesium ( $\text{Mg}^{2+}$ )	nitrate ( $\text{NO}_3^-$ )
manganese(II) or manganous ( $\text{Mn}^{2+}$ )	nitride ( $\text{N}^{3-}$ )
mercury(I) or mercurous ( $\text{Hg}_2^{2+}$ )*	nitrite ( $\text{NO}_2^-$ )
mercury(II) or mercuric ( $\text{Hg}^{2+}$ )	oxide ( $\text{O}^{2-}$ )
potassium ( $\text{K}^+$ )	permanganate ( $\text{MnO}_4^-$ )
rubidium ( $\text{Rb}^+$ )	peroxide ( $\text{O}_2^{2-}$ )
silver ( $\text{Ag}^+$ )	phosphate ( $\text{PO}_4^{3-}$ )
sodium ( $\text{Na}^+$ )	sulfate ( $\text{SO}_4^{2-}$ )
strontium ( $\text{Sr}^{2+}$ )	sulfide ( $\text{S}^{2-}$ )
tin(II) or stannous ( $\text{Sn}^{2+}$ )	sulfite ( $\text{SO}_3^{2-}$ )
zinc ( $\text{Zn}^{2+}$ )	thiocyanate ( $\text{SCN}^-$ )

\*Mercury(I) exists as a pair as shown.

Name → formula

ex: lithium hydroxide



ex: magnesium hydroxide



ex: Calcium phosphate

