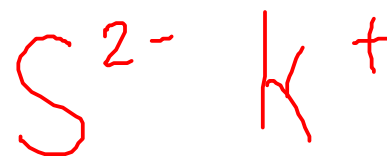
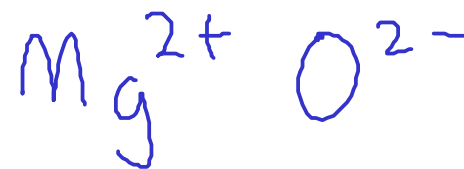
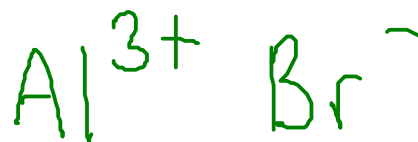


## EXAMPLES

IA		EXAMPLES										VIII A					
IA	IIA	III A	IV A	V A	VI A	VII A	VIII A						VIII A				
H	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	Db	Sg	Bh	Hs	Mt	*"inner" transition metals go here								

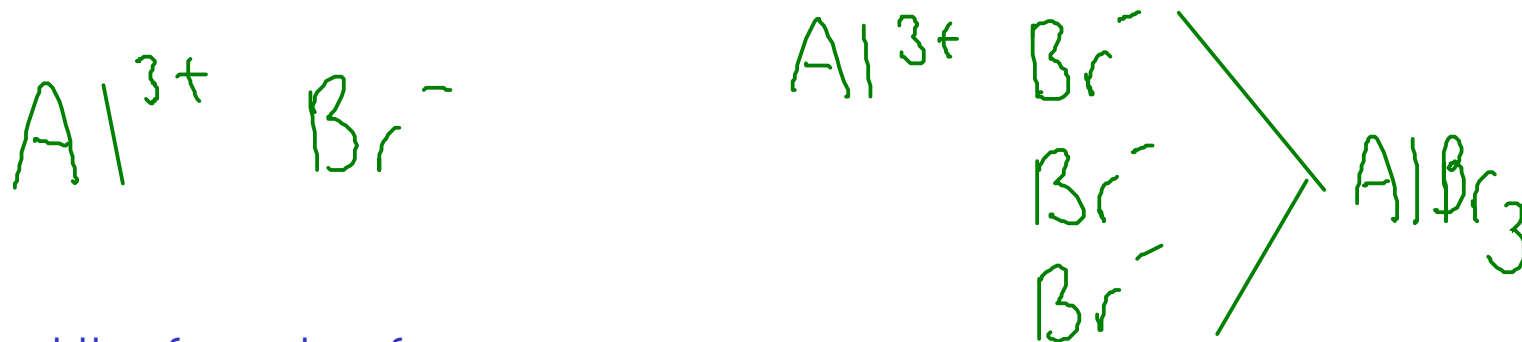
Find the formulas of:

- (1) an ionic compound containing Al and Br
- (2) an ionic compound containing Mg and O
- (3) an ionic compound containing S and K



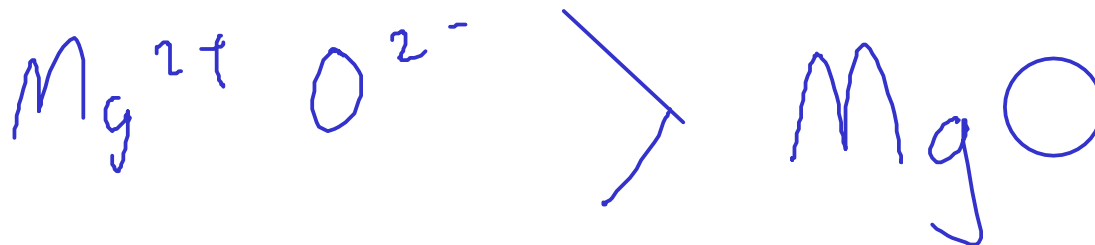
Find the formula of:

\* an ionic compound containing Al and Br



Find the formula of:

\* an ionic compound containing Mg and O

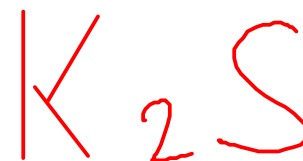


Find the formula of:

\* an ionic compound containing S and K



Remember to always write the cation (+) first in the formula of an ionic compound ----->



## TRANSITION METAL IONS

IA		TRANSITION METAL IONS										VIII A					
IA	IIA	IIIB	IVB	VB	VIB	VII B	VIII B	IB	IIB	IIIA	IVA	VA	VIA	VIIA	VIII A		
H	Li														He		
	Be																
	Mg																
Na	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	Db	Sg	Bh	Hs	Mt	*"inner" transition metals go here								

The transition metals always form CATIONS!

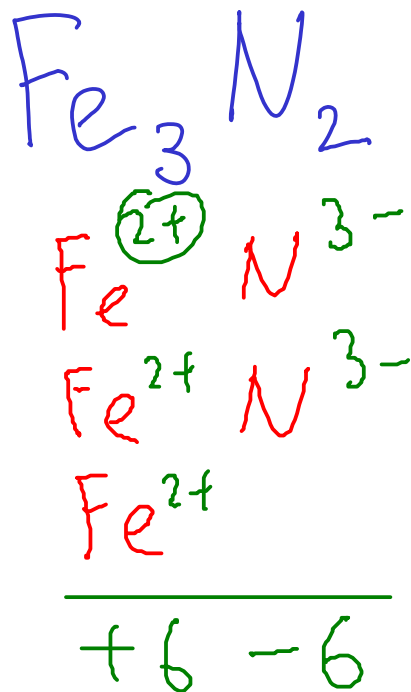
However, many transition metals are capable of forming SEVERAL DIFFERENT CATIONS!

Example: Iron (Fe) forms two cations, depending on the situation:  $\text{Fe}^{2+}$  or  $\text{Fe}^{3+}$

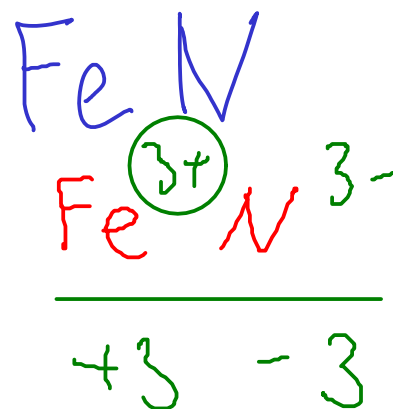
## TRANSITION METAL CATIONS

- So how do you know which cation you're dealing with? For now, you'll have to be told
- Either the chemical formula of an ionic compound or the name of an ionic compound can tell you what charge is on the transition metal cation.

Examples:



Each iron atom has a charge of +2. We call this kind of iron ion "iron(II)", pronounced "iron two". The compound is called "iron(II) nitride".



Each iron atom has a charge of +3. We call this kind of iron ion "iron(III)", pronounced "iron three". The compound is called "iron(III) nitride".

POLYATOMIC IONS

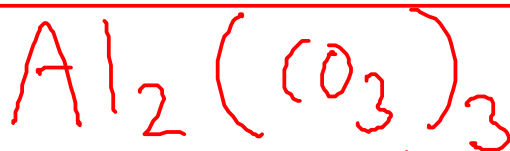
- Some MOLECULES can gain or lose electrons to form CATIONS or ANIONS. These are called POLYATOMIC IONS

- Polyatomic ions form ionic compounds in the same way that single-element ions do.

Example:  $\text{CO}_3^{2-}$  : CARBONATE ION

\* Compare  
to  
 $\text{Al}_2\text{O}_3$

from  
 $\text{Al}^{3+}$   $\text{O}^{2-}$



\* Use parenthesis when an ionic compound's formula contains more than one of a polyatomic ion.

See the web site or page 63 - table 2.5 (9th ed) or table 2.6 (10th ed) - for a list of common polyatomic ions!

## NAMES OF IONS

- To properly discuss ions and ionic compounds, we have to know how to name them!

### CATIONS

3 kinds:

① Main group cations (metals that take only one charge when forming ions)

- The element's name is the same as the ion's name!



② Transition metal cations (from metals that can form several cations)

- The CHARGE of the cation must be given. Use a ROMAN NUMERAL after the element name to indicate charge!



③ Polyatomic cations

- Memorize list.



## ANIONS

2 kinds

①

Main-group nonmetals

- Use the STEM NAME of the element, then add "-ide" suffix

 $\text{N}^{3-}$  : "nitride" ion $\text{P}^{3-}$  : "phosphide ion" $\text{S}^{2-}$  : sulfide ion $\text{O}^{2-}$  : "oxide ion" $\text{F}^{-}$  : "fluoride ion"

②

Polyatomic ions

- Memorize list.(see web site)

 $\text{C}_2\text{H}_3\text{O}_2^-$  : "acetate ion" $\text{SO}_4^{2-}$  : "sulfate ion" $\text{NO}_3^-$  : "nitrate ion" $\text{SO}_3^{2-}$  "sulfite ion" $\text{NO}_2^-$  : "nitrite ion"

\* Polyatomic ions ending in "-ate" and "-ite" suffixes always contain oxygen! "-ate" ions have more oxygen atoms than their "-ite" counterparts.

## NAMING IONIC COMPOUNDS

- The name of the compound is based on the name of the ions in the compound
- Cation first, anion second

Examples:



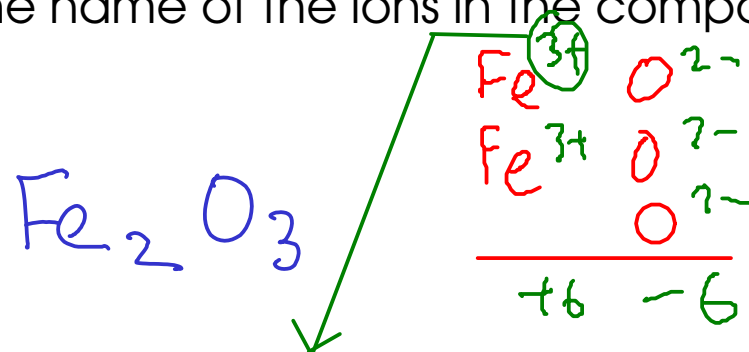
magnesium hydroxide



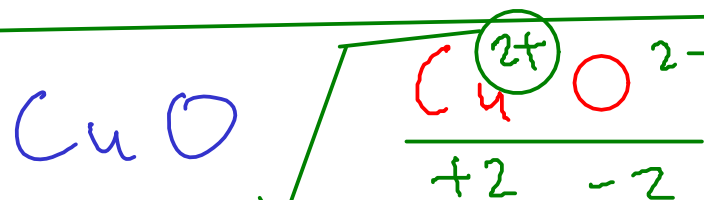
sodium sulfide



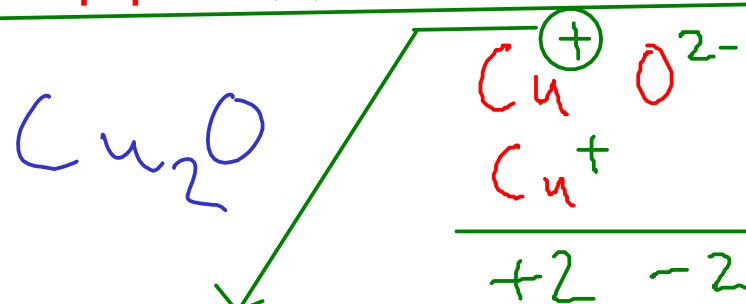
beryllium bromide



iron(III) oxide



copper(II) oxide



copper(I) oxide

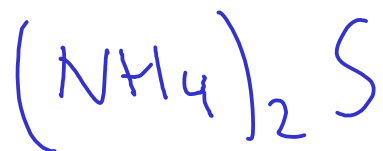
\* Remember to include the Roman numeral for CHARGE when you're writing transition metal compound names!

Page 63 (9th edition): Chart of polyatomic ions

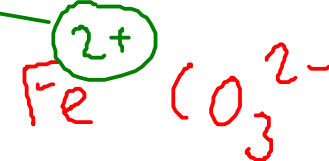
Page 64 (10th edition)



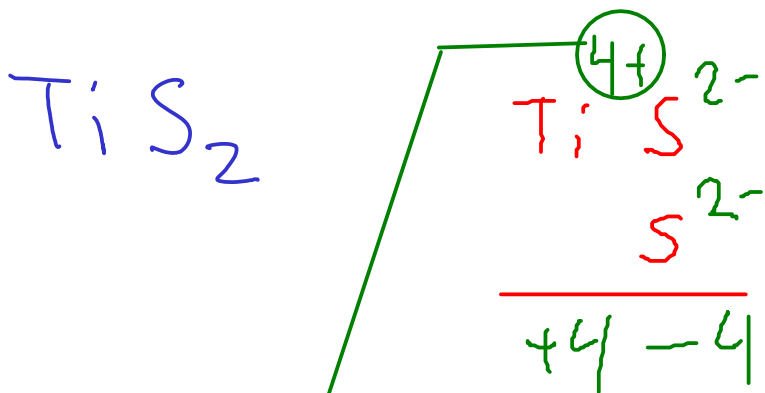
## NAMING IONIC COMPOUNDS



ammonium sulfide



iron(II) carbonate



titanium(IV) sulfide



barium phosphate

SPELLING  
MATTERS!



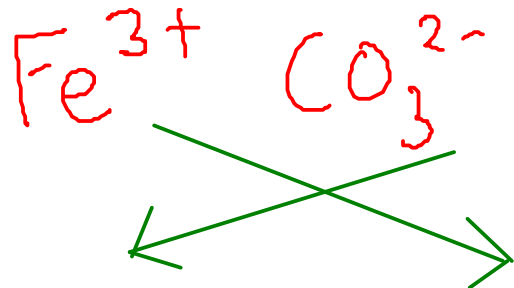
barium phosphide

## DETERMINING THE FORMULA OF AN IONIC COMPOUND FROM THE NAME

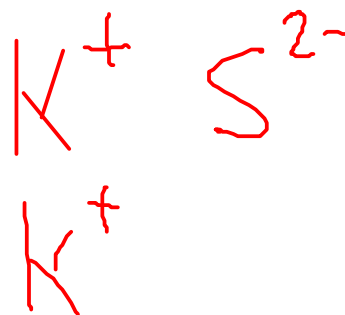
- The name of an ionic compound is made of the names of the CATION and ANION in the compound.
  - To get the FORMULA, you must figure out the SMALLEST RATIO of cation to anion that makes the charges balance out
- 

Examples:

iron(III) carbonate



potassium sulfide



calcium bromide

