

## Glencoe Chapter 8 Ionic Compounds

There are two kinds of compounds:  
Ionic and Covalent

Ionic compounds are those compounds  
which are formed  
from the attraction of  
positive to the negative IONS.

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### Ions

- Cation: A *positive* ion
  - $Mg^{+2}$ ,  $NH_4^{+1}$
- Anion: A *negative* ion
  - $Cl^{-1}$ ,  $SO_4^{-2}$
- Formation of ions: When an atom has an incomplete outer shell of electrons, they gain or lose electrons in order to be stable.

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### How to write charges on ions

- Charge of ion is written as superscript on top right corner of symbol.
- Cations *must* have the + sign included.
- Anions *must* have the – sign included.
- For a neutral atom, you can put a 0 for no charge.



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## Naming Ions

Metals (cations) use just the metal name:

calcium ion

Non-metals (anions) use the name of

the atom and then modify end to "ide":

chloride ion

1 H 1.008																	2 He 4.0026
3 Li 6.94	4 Be 9.0122											5 B 10.81	6 C 12.011	7 N 14.007	8 O 15.999	9 F 18.998	10 Ne 20.180
11 Na 22.990	12 Mg 24.305											13 Al 26.982	14 Si 28.086	15 P 30.974	16 S 32.06	17 Cl 35.453	18 Ar 39.948
19 K 39.098	20 Ca 40.078	21 Sc 44.956	22 Ti 47.88	23 V 50.942	24 Cr 51.996	25 Mn 54.938	26 Fe 55.845	27 Co 58.933	28 Ni 58.693	29 Cu 63.546	30 Zn 65.38	31 Ga 69.723	32 Ge 72.64	33 As 74.922	34 Se 78.96	35 Br 79.904	36 Kr 83.80
37 Rb 85.468	38 Sr 87.62	39 Y 88.906	40 Zr 91.224	41 Nb 92.906	42 Mo 95.94	43 Tc 98	44 Ru 101.07	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.76	52 Te 127.6	53 I 126.905	54 Xe 131.29
55 Cs 132.905	56 Ba 137.33	57 La 138.905	58 Ce 140.12	59 Pr 140.908	60 Nd 144.24	61 Pm 145	62 Sm 150.36	63 Eu 151.964	64 Gd 157.25	65 Tb 158.925	66 Dy 162.50	67 Ho 164.930	68 Er 167.26	69 Tm 168.934	70 Yb 173.054	71 Lu 174.967	72 Hf 178.49
73 Ta 180.948	74 W 183.84	75 Re 186.207	76 Os 193.224	77 Ir 192.222	78 Pt 195.084	79 Au 196.967	80 Hg 200.59	81 Tl 204.387	82 Pb 207.2	83 Bi 208.980	84 Po 209	85 At 210	86 Rn 222	87 Fr 223	88 Ra 226	89 Ac 227	90 Th 232
91 Pa 231	92 U 238.03	93 Np 237	94 Pu 244	95 Am 243	96 Cm 247	97 Bk 247	98 Cf 251	99 Es 252	100 Fm 257	101 Md 258	102 No 259	103 Lr 260	104 Rf 261	105 Db 262	106 Sg 263	107 Bh 264	108 Hs 265
109 Mt 268	110 Ds 271	111 Rg 272	112 Cn 285	113 Nh 286	114 Fl 289	115 Mc 290	116 Lv 293	117 Ts 294	118 Og 294	119 Uu 295	120 Uub 296	121 Uut 297	122 Uuq 298	123 Uuq 299	124 Uuq 301	125 Uuq 302	126 Uuq 303

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## Nomenclature

In order to "do" chemistry, we have to have a way to communicate names of compounds and the formulas for them.

Chapter 8 deals with IONIC compounds and Chapter 9 deals with COVALENT compounds. The next slides will show you how to write formulas of ionic compounds and how to name them.

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## Simple binary ionic compounds

Group 1, 2, 13 metals with non - metals

To write the formula (given the name):

What group is the metal in? Write the symbol and charge.

What group is the non-metal in? Write the symbol and charge.

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Determine how many of each ion you need to have an overall 0 charge.  
Use subscripts to identify that quantity.

Sodium oxide

Magnesium chloride

Aluminum sulfide

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To write the proper name (given the formula):

Write down the name of the metal first from the formula.

Then, write down the name of the non-metal second but change the suffix to "ide".



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**YOU write the correct formulas:**

1. Calcium chloride
2. Magnesium bromide
3. Sodium iodide
4. Potassium oxide
5. Aluminum nitride
6. Sodium phosphide
7. Strontium nitride

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**Group 1, 2, 13 with polyatomic ions**

**To write the proper formula:**

When you have an ion that you don't immediately recognize, use your polyatomic ion sheet.

Find the name/symbol and the charge.

Use subscripts to make overall charge 0.

If you have "more than 1" polyatomic ion, use ( ) and then write subscript.

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Lithium carbonate

Aluminum phosphate

Sodium sulfate

Calcium nitrate

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**To write the proper name:**

From the formula, identify the metal and the polyatomic ion name ( as indicated on your polyatomic ion sheet).

Write down the name of the metal first.

Write down the name of the polyatomic ion second.

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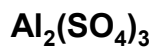
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**Transitional metals  
with a non-metal or polyatomic ion**

To write the proper formula:

Use the general process for other ionic nomenclature.

Remember, transition metals can have more than one charge. The roman numeral in the name tells you the charge.

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**Lead (IV) phosphide**

**Iron (III) nitrate**

**Tin (IV) oxide**

**Iron (II) sulfate**

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**To write the proper name:**

What's the name of the transitional metal?  
You will need to figure out what particular charge you have by first checking the rest of the compound.

What's the name of the non-metal or polyatomic ion (see sheet)?

Going "backwards" using the subscripts, determine the charge for the metal.

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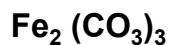
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Then, use a roman numeral (in parentheses) to indicate the correct charge for the transitional metal.



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**Ionic Compound Summary**

Simple binary ionic compounds

- Suffix on non-metal is *-ide*
- Include charges and use periodic table
- Make sure overall charge is 0

Polyatomic ions

- Use polyatomic ion sheet
- Charge indicated is on **WHOLE** ion
- Use ( ) when you have a **MULTIPLE** of a polyatomic ion

Transitional metals

- Roman numeral indicate charge when written in the name of the ionic compound

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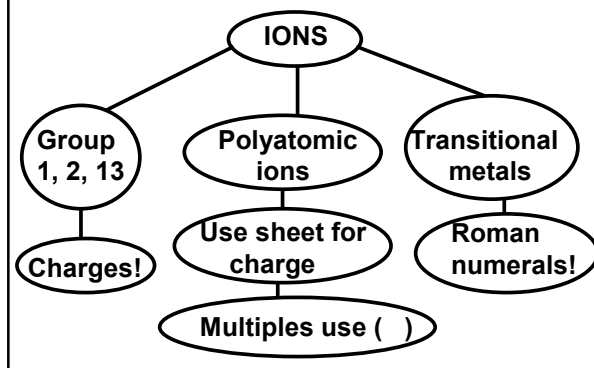
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### Ionic Nomenclature Concept Map



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