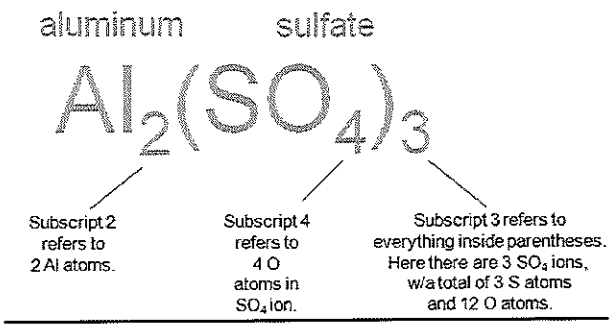
How to Count Atoms



Roman Numerals

I	II	III	IV	V
1	2	3	4	5
VI	VII	VIII	IX	X
6	7	8	9	10

Writing Ionic Formulas Resource

Criss Cross Rule

- Charge of cation/anion "becomes" subscript of anion/cation (drop the + and -)
- Reduce to lowest terms
- Always write the metal (cation) 1st
- Never write in the 1

calcium chloride	aluminum oxide	magnesium oxide
Ca^{+2} Cl^{-1} Cl^{-} $CaCl_2$	Al^{+3} O^{-2} Al^{+3} O^{-2} O^{-2} Al_2O_3	Mg^{+2} O^{-2} MgO

Rules for When Parentheses are Needed

1. Polyatomic ion present AND
2. 2 or more of that ion is present

Magnesium nitrate	Ammonium chlorate	Barium sulfate
$Mg(NO_3)_2$ Mg^{+2} NO_3^{-1} NO_3^{-1}	NH_4^{+} ClO_3^{-1} NH_4ClO_3	Ba^{+2} SO_4^{-2}

Multiple Charges on Cations

- Transition metals, tin, lead
- The charge of the cation is the roman numeral in parentheses

Cobalt (III) chloride	Tin (II) hydroxide	Tin (IV) oxide
Co^{+3} Cl^{-1} Cl^{-} Cl^{-} $CoCl_3$	Sn^{+2} OH^{-} OH^{-} $Sn(OH)_2$	Sn^{+4} O^{-2} O^{-2} SnO_2