SNC2D

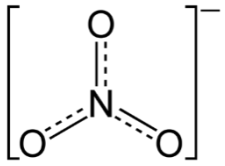
Ms. Kueh

Polyatomic Ions

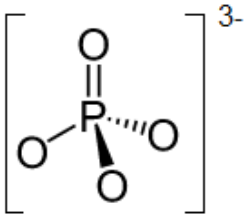
A polyatomic ion is a group of atoms with a net charge that act together as a group:

For Example:

Nitrate NO_3^{1-} has a net charge of **1-**



Phosphate PO_4^{3-} has a net charge of of **3-**



Example 1 Name the compound $KN0_3$

Step One

Write out the elemental name from the formula and include all of the ion charges for each element. In this case you have to recognize that there is a polyatomic ion present:

KNO_3

Potassium **(1+)** Nitrate **(1-)**

Note: the second part in a binary compound is *always* negative

Step Two

Since there is only one ion charge (they are not multivalent) for each you write:

Potassium Nitrate

Example 2 Name the compound $FeCO_3$

If there is more than one ion charge (multivalent) for the metal you would have to use the rules for multivalent ions to determine which Roman numeral to use in the name.

Example 3 Name the compound $Ca(NO_3)_2$

The same rules apply as above. The brackets around the **$(NO_3)_2$** are used to show the presence of two **NO_3^{1-}** groups, the net charge on the two groups would be 2 x **1-** = **2-**, which would balance the Ca^{2+}. The number of nitrate groups does not matter in the name since there must be exactly two nitrate groups, so the name is

Calcium Nitrate

Table of Polyatomic Ions

+1 CHARGE		-1 CHARGE		-2 CHARGE		-3 CHARGE	
ion	*name*	*ion*	*name*	*ion*	*name*	*ion*	*name*
NH_4^+	**ammonium**	**NO_3^-**	**nitrate**	**CO_3^{2-}**	**carbonate**	**PO_4^{3-}**	**phosphate**
H_3O^+	**hydronium**	**ClO_3^-**	**chlorate**	**SO_4^{2-}**	**sulfate**		
		HCO_3^-	**hydrogen carbonate (bicarbonate)**	**SO_3^{2-}**	**sulfite**		
		OH^-	**hydroxide**				
		NO_2^-	**nitrite**				

Formula to Names (Polyatomic Ions) – Practice Sheet

Compound Formula	**Step 1** Write out the Name of the Elements with Ion Charges	**Step 2** Work out the Positive Ion Charge	**Step 3** Add the proper Roman Numeral (If necessary)
$Cu(NO_3)_2$	Copper $^{(1+,2+)}$ Nitrate $^{(1-)}$	2 ions x 1- = 2- only one Cu therefore ion charge must be 2+	Copper (II) Nitrate
$ZnSO_4$	Zinc $^{(2+)}$ Sulphate $^{(2-)}$		Zinc Sulphate (No Roman Numeral needed as Zn has only one ion charge)

Compound Formula	**Step 1** Write out the Name of the Elements with Ion Charges	**Step 2** Work out the Positive Ion Charge	**Step 3** Add the proper Roman Numeral (If necessary)
$Co(NO_2)_2$	Cobalt $^{(2+,\ 3+)}$ Nitr**ite** $^{(1-)}$		Cobalt (II) Nitrite
$AuPO_4$			Gold (III) Phosphate
$Cd(NO_3)_2$			Cadmium Nitrate
$Pb(ClO_3)_4$			Lead (IV) Chlorate
$Sn_3(PO_4)_2$			Tin (II) Phosphate
$Ca(NO_3)_2$			Calcium Nitrate
$Al(OH)_3$			Aluminum Hydroxide
$Sn(SO_4)_2$			Tin (IV) Sulfate

Compound Formula	**<u>Step 1</u>** Write out the Name of the Elements with Ion Charges	**<u>Step 2</u>** Work out the Positive Ion Charge	**<u>Step 3</u>** Add the proper Roman Numeral (If necessary)
$Bi(OH)_5$			Bismuth (V) Hydroxide
$CuClO_3$			Copper (I) Chlorate
$CrPO_4$			Chromium (III) Phosphate
$Ni(NO_3)_3$			Nickel (III) Nitrate
K_3PO_4			Potassium Phosphate
$Sb(NO_2)_5$			Antimony (V) Nitrite
$AgNO_3$			Silver Nitrate
Hg_2SO_4			Mercury (I) Sulfate