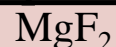


Chemical Names and Formulas of Compounds

PowerPoint 4.2

How to Determine the Chemical Name of an Ionic Compound



1. Name the metal ion, the cation. Magnesium

Magnesium donates two electrons, one to each fluorine, leaving it with a charge of 2+.

2. Name the non-metal, the anion, adding the suffix *-ide*. Fluoride

Each fluorine atom receives an electron from magnesium thereby forming the fluoride anion.

3. Write the name of the compounds, with the cation first.

Magnesium fluoride

How to Determine the Chemical Formula for an Ionic Compound

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|--|--|--------------------|-----------|--------------------|--------------|-------------|----------------|
| | Magnesium and fluoride | | | | | | |
| 1. Identify each ion and their respective charges. | Mg^{2+} and F^- | | | | | | |
| 2. Determine the number of each ion needed to balance the positive and negative charges. | <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding-right: 10px;">Mg^{2+}</td> <td style="padding-right: 10px;">$+2 = +2$</td> <td style="padding-right: 20px;">1 Mg^{2+}</td> </tr> <tr> <td>F^-</td> <td>$-1-1 = -2$</td> <td>2 F^-</td> </tr> </table> | Mg^{2+} | $+2 = +2$ | 1 Mg^{2+} | F^- | $-1-1 = -2$ | 2 F^- |
| Mg^{2+} | $+2 = +2$ | 1 Mg^{2+} | | | | | |
| F^- | $-1-1 = -2$ | 2 F^- | | | | | |
| 3. Note the ratio of positive and negative ions | There are 2 F^- for each 1 Mg^{2+} . | | | | | | |
| 4. Write the formula with the ratio in subscript numbers | MgF_2 | | | | | | |
| ➤ A “1” is not written in the formula. | | | | | | | |
| ➤ Usually, the ratio is simplified if possible. | Chemical equation, $\text{Mg}^{2+} + 2\text{F}^- \rightarrow \text{MgF}_2$ | | | | | | |

How to Determine the Chemical Formula for Ionic Compounds with Multivalent Metals

- | | | | | | | | |
|--|--|-------------------------|-----------------------------|--------------------|-----------------|-----------|-------------------|
| | Chromium (III) nitride | | | | | | |
| 1. Identify each ion and their respective charges. | Cr^{3+} and N^{3-} | | | | | | |
| 2. Determine the number of each ion needed to balance the positive and negative charges. | <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding-right: 10px;">Cr^{3+}</td> <td style="padding-right: 10px;">$+3 = +3$</td> <td style="padding-right: 20px;">1 Cr^{3+}</td> </tr> <tr> <td>N^{3-}</td> <td>$-3 = -3$</td> <td>1 N^{3-}</td> </tr> </table> | Cr^{3+} | $+3 = +3$ | 1 Cr^{3+} | N^{3-} | $-3 = -3$ | 1 N^{3-} |
| Cr^{3+} | $+3 = +3$ | 1 Cr^{3+} | | | | | |
| N^{3-} | $-3 = -3$ | 1 N^{3-} | | | | | |
| 3. Note the ratio of positive and negative ions | There is 1 Cr^{3+} for each 1 N^{3-} . | | | | | | |
| 4. Write the formula with the ratio in subscript numbers | <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding-right: 20px;">Cr_3N_3</td> <td style="padding-right: 20px;">$\frac{3}{3} = \frac{1}{1}$</td> </tr> <tr> <td>$\text{CrN}$</td> <td></td> </tr> </table> | Cr_3N_3 | $\frac{3}{3} = \frac{1}{1}$ | CrN | | | |
| Cr_3N_3 | $\frac{3}{3} = \frac{1}{1}$ | | | | | | |
| CrN | | | | | | | |
| ➤ A “1” is not written in the formula. | “Chromium three nitride” | | | | | | |
| ➤ The ratio is typically simplified if possible. | | | | | | | |
| Cross-Over rule $\text{Cr}^{3+}\text{N}^{3-} \rightarrow \text{CrN}$ | Chemical equation, $\text{Cr}^{3+} + \text{N}^{3-} \rightarrow \text{CrN}$ | | | | | | |

How to Determine Chemical Name for Ionic Compounds with Multivalent Metals

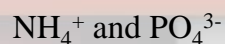
	Cu_3P
1. Identify the metal and its possible ions.	Cu, copper Cu^+ ou Cu^{2+}
2. Note the charge on the anion from the Periodic Table and determine the charge on the metal taking into account the number of each ion.	P^{3-} $1(-3) = -3$ Cu^x $3(x) = +3$ $x = +1$
<ul style="list-style-type: none"> ➤ The positive and negative charges must balance. ➤ Determine the positive charge needed to balance 	The copper ion in this compound is copper (I).
4. Write the name of the compound with the cation first.	Copper (I) phosphide

How to Determine the Chemical Name for Ionic Compounds with Polyatomic Ions

	$\text{Al}_2(\text{SO}_4)_3$
1. Identify each ion and their respective charges.	Al^{3+} and SO_4^{2-}
<ul style="list-style-type: none"> ➤ Tip - If you don't find the element on the Periodic Table check the list of polyatomic ions. 	
2. Write the name of the compound with the cation first.	Aluminum sulfate

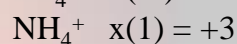
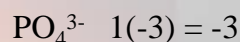
How to Determine the Chemical Formula for Ionic Compounds with Polyatomic Ions

Ammonium phosphate



1. Identify each ion and their respective charges.
 - Tip - If you don't find the element on the Periodic Table check the list of polyatomic ions.

2. Determine the ratio of ions needed to balance the positive and negative charges.



$x = 3$

- The positive and negative charges must balance.

There are 3 NH_4^+ for each 1 PO_4^{3-} .

3. Write the name of the compound with the cation first.

- Place brackets around polyatomic ions if more than one is needed.

