Writing formulas for ionic compounds

Learning objectives

1 Recall the names and formulas of common positive and negative ions.

2 Write formulas of ionic compounds.

Introduction

Writing and combining ionic formulas is a crucial skill in chemistry. In this task, you will first build your knowledge of the formulas of some common positive and negative ions. You will then combine these to create formulas of ionic compounds.

Activity 1: ion formulas

Work in groups to complete Activity 1 by writing the names of ions in the appropriate places. Remember:

- For any **transition metal** ions, you must use the roman numerals to indicate the charge of the ion *e.g. cobalt(II) ions are* Co^{2+}.
- Negative ions change the second part of their name to end in '-ide' or '-ate'.

Formula	Name of ion
Na^+	
K^+	
Ag^+	
NH_4^+	
Ca^{2+}	
Mg^{2+}	
Pb^{2+}	
Zn^{2+}	
Cu^{2+}	
Fe^{2+}	
Fe^{3+}	
Al^{3+}	

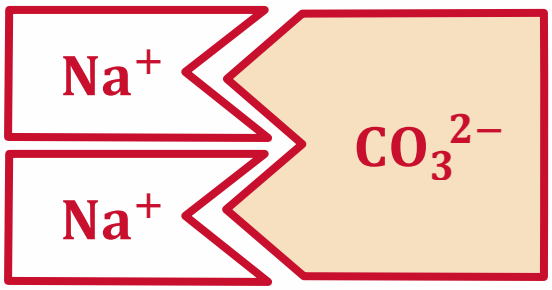
Formula	Name of ion
Cl^-	
Br^-	
I^-	
NO_3^-	
N^{3-}	
OH^-	
CO_3^{2-}	
S^{2-}	
SO_4^{2-}	

Activity 2: formulas for ionic compounds

Use the ion formula cards to construct formulas for the following ionic compounds. Then write the formulas into the table.

Worked example

Constructing the formula of sodium carbonate to balance the charges:



Formula is Na_2CO_3

Compound	Formula
Magnesium carbonate	
Silver(I) nitrate	
Calcium bromide	
Copper(II) hydroxide	
Iron(II) nitrate	
Iron(III) iodide	
Lead sulfate	

Compound	Formula
Zinc nitrate	
Potassium sulfate	
Magnesium sulfide	
Aluminium hydroxide	
Ammonium chloride	
Sodium hydrogen carbonate	
Iron(III) carbonate	

Review: magnesium nitride vs magnesium nitrate

What do we now know about the differences between magnesium nitride, Mg_3N_2 and magnesium nitrate, $Mg(NO_3)_2$?

- Write a short explanation of the different ions these compounds contain.
- You can use diagrams, similar to those you used in Activity 2.
- If you came up with other examples of 'ides' and 'ates', do the same for these compounds.