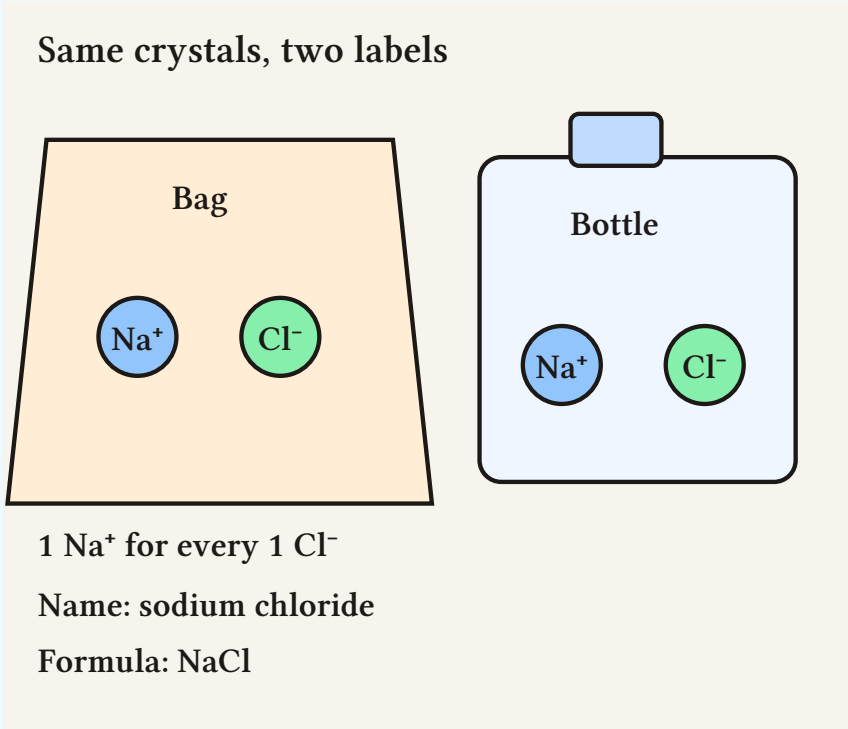
Chemistry 20

Unit A: Matter and chemical bonding

Ionic names and ratios

Two labels for the same white crystals

- A road-salt bag may say sodium chloride, while a lab bottle of the same crystals says NaCl.
- The name and the formula describe one ratio of sodium ions and chloride ions.



Ionic names and formulas

- The cation name comes first, then the anion, and a multivalent metal carries a Roman numeral for its charge.
- Subscripts are the smallest whole numbers that make the total positive charge equal the total negative charge.

Key terms

ionic compound

A pure substance made from positive ions and negative ions held in a fixed ratio. (NaCl)

formula unit

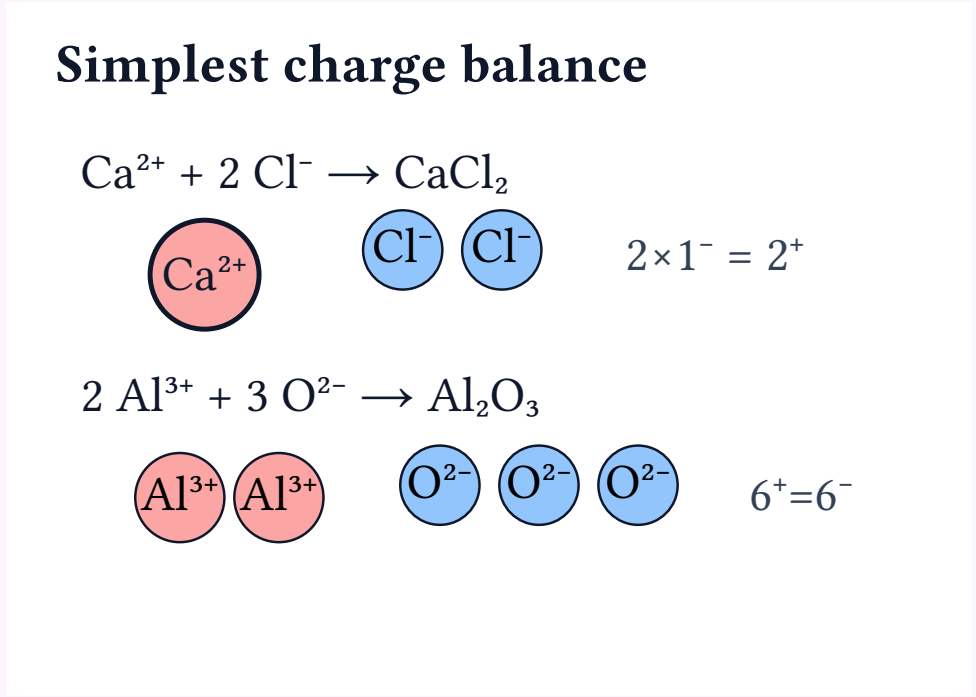
The simplest whole-number ratio of ions that represents an ionic compound. ($CaCl_2$)

net charge

The sum of all ion charges in a formula unit. A stable ionic formula has a net charge of zero. (0)

Simplest charge balance

- Calcium ion is Ca^{2+} and chloride is Cl^{-}, so two chlorides accompany each calcium in $CaCl_2$.
- Aluminum ion is Al^{3+} and oxide is O^{2-}, so the smallest balance is Al_2O_3.



From iron(III) chloride to $FeCl_3$

- Iron(III) means Fe^{3+}, and chloride means Cl^-.
- Three chloride ions cancel one iron(III) ion, so the formula unit is $FeCl_3$.

Completing aluminum sulfate

- Aluminum is Al^{3+} and sulfate is SO_4^{2-}.
- The smallest whole-number balance uses two aluminum ions and three sulfate ions.

Names and ratios

- Name CuO and Cu_2O with Roman numerals that match the copper charge.
- Write the formula unit for calcium nitrate and show that its charges sum to zero.