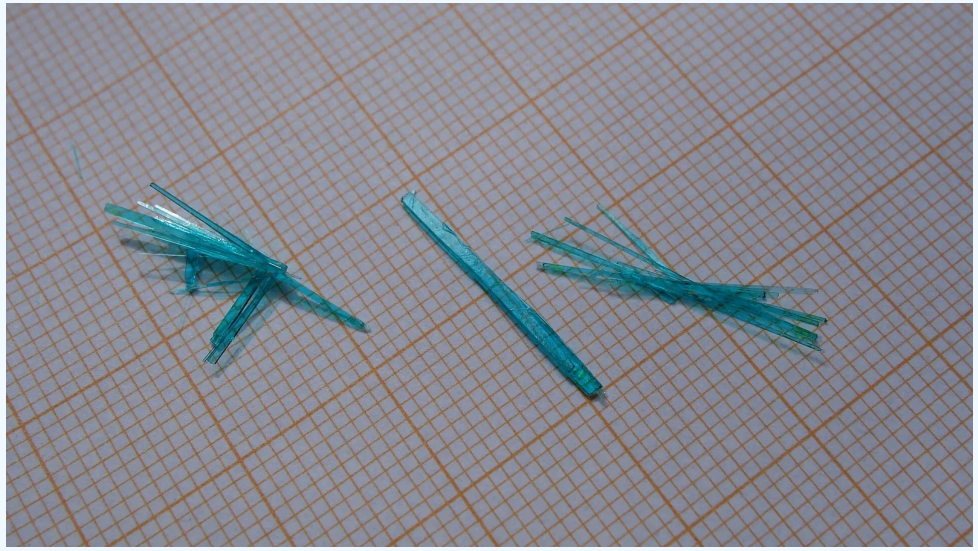
Science 10

Unit A: Energy and matter in chemical change

Naming ionic and molecular compounds

An incomplete label

- A shelf label that says only “copper chloride” could refer to CuCl or $CuCl_2$.
- The formulas contain different copper-ion charges and identify different compounds.
- A systematic name must preserve the evidence needed to identify the intended substance.



Choosing a naming system

- Metal or ammonium with an anion: use the ionic path and determine whether a Roman numeral is required.
- Two non-metals: use the binary molecular path and let prefixes state atom counts.
- A formula beginning with hydrogen and marked aqueous: use the required acid naming path.

Key terms

International Union of Pure and Applied Chemistry (IUPAC)

International organization that develops standardized chemical naming recommendations.

prefix

A word part that indicates the number of atoms in a molecular-compound name.

binary molecular

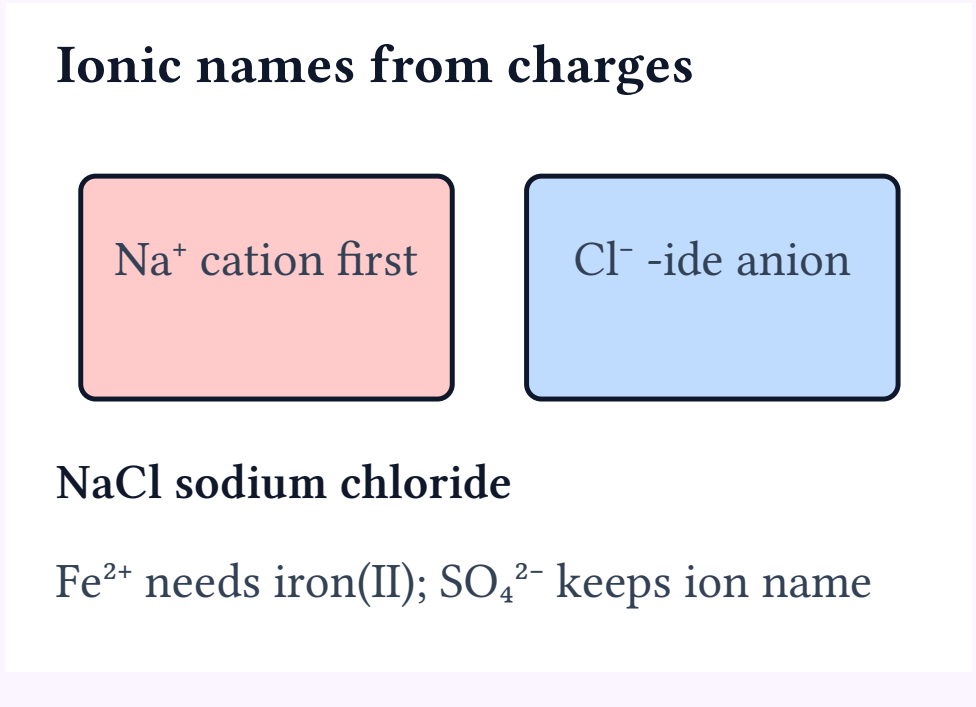
Describing a molecular compound made from two different elements.

polyatomic ion

A charged group of covalently bonded atoms that acts as one ion.

Ionic names from charges

- Name the cation first; a fixed-charge metal needs no Roman numeral, while a variable-charge metal does.
- A monatomic anion ends in -ide; a polyatomic ion keeps its established ion name.
- For $FeCl_3$, three Cl^- ions total −3, so iron is Fe^{3+} and the name is iron(III) chloride.



Molecular naming

- Prefixes show atom counts: carbon dioxide, dinitrogen tetroxide.
- Second element ends in -ide with prefix even if mono- (monoxide).

mono-	= 1	CO (carbon monoxide)
di-	= 2	CO_2 (carbon dioxide)
tri-	= 3	SO_3
tetra-	= 4	CCl_4

Aqueous solutions and acid names

- HCl(g) is hydrogen chloride; HCl(aq) is hydrochloric acid in the required acid-naming set.
- For a binary acid, identify the anion stem, then use hydro- + stem + -ic acid.
- Reverse-check the completed acid name against the aqueous formula and the supplied ion table.

Naming and writing

- Name K_2S, $CuCl_2$, SF_6, and $HNO_3(aq)$; classify each before applying a rule.
- Write formulas for sodium carbonate, iron(III) oxide, sulfur trioxide, and hydrochloric acid.
- Reverse-check every answer by rebuilding the starting name or formula.

Safety

Labels matter

- A prefix, a Roman numeral, or an ion name can point to a different substance.
- Match the full name to the formula before you look up hazards.
- The same name can still need different handling if the concentration or state changes.
- Use the product label and the safety data sheet. Check each name against the formula.

Chemical naming retrieval check

- Name Na_2SO_4 and explain why no molecular prefixes are used.
- Name P_4O_{10} using molecular prefixes.
- Write formulas for calcium chloride and dinitrogen monoxide.

mono-	= 1	CO (carbon monoxide)
di-	= 2	CO_2 (carbon dioxide)
tri-	= 3	SO_3
tetra-	= 4	CCl_4

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