

Naming chemical compounds (chemical nomenclature)

Is the substance a **pure** compound, a **hydrate** (which will have a “ $\cdot x\text{H}_2\text{O}$ ” at the end) or an **acidic solution**, signified by starting with an H (hydrogen) and the state symbol (aq)?

If **pure**, go to the *Rules of chemical nomenclature for pure substances*

If a **hydrate**, name the non-hydrate part by the appropriate rules for pure *ionic compounds*, then at the end of the name, add “**(prefix indicating the number of water molecules attached)–hydrate**”

If an **acid**, go to the *Acid naming rules*

Rules of chemical nomenclature for pure substances

Is the compound made of a combination of **metal and non-metal** elements (any number of atoms) or **two non-metal** elements (any number of atoms)?

If **both** elements are non-metals, go to *Covalent compound nomenclature rules*

Otherwise, is the compound made of **exactly** two elements or **more than** two elements?

If exactly two elements, go to *Binary ionic compound nomenclature rules*

If more than two elements, go to *Multi-atom ionic compound nomenclature rules*

Covalent compound nomenclature rules

Name the elements in the order presented in the chemical formula.

The second element's ending is changed to “**-ide**”.

Add a prefix indicating the number of atoms of each element in the compound's chemical formula to the beginning of each element name. **Exception:** If the first element has only one atom, then the prefix “mono-“ is omitted.

Binary ionic compound nomenclature rules

Name the elements in the order presented in the chemical formula.

The second element's ending is changed to “**-ide**”.

No prefixes are necessary.

In the case of a transition metal ion (where the metal is known to have more than one possible ionic charge), specify the charge by writing the number of the charge in **Roman numerals inside parentheses** after the transition metal element name. No plus sign needs to be included.

Multi-atom ionic compound nomenclature rules

Determine the multi-atom cation or anion name. No prefixes are necessary.

Name the elements (or multi-atom ion) in the order presented in the chemical formula.

In the case of a transition metal ion (where the metal is known to have more than one possible ionic charge), specify the charge by writing the number of the charge in **Roman numerals inside parentheses** after the transition metal element name. No plus sign needs to be included.

Acid naming rules

Is the acid made of hydrogen and one other atom?

If yes, then name the acid “**hydro–(element name root)–ic acid**”

If no, then the acid is made of hydrogen(s) and a multi-atom anion

Determine the multi-atom anion name

If the name of the anion ends with “–ate”, then name the acid “**(multi-atom anion name root)–ic acid**”

If the name of the anion ends with “–ite”, then name the acid “**(multi-atom anion name root)–ous acid**”