



## Naming Ions

### Keys for Naming Single Element Ions (e.g. $\text{Na}^+$ , $\text{Cl}^-$ )

To name *positive* ions (called cations) write the name as found on the Periodic Table and add the word *ion*.

$\text{Na}^+$  is the Sodium ion

$\text{Ca}^{2+}$  is the Calcium ion.

$\text{Al}^{3+}$  is the Aluminum ion

For the *negative* ions (called anions) use the name from the Periodic Table but replace the ending with *ide*. Then add the word *ion*.

$\text{Cl}^-$  is the *Chloride* ion

$\text{O}^{2-}$  is the *Oxide* ion.

$\text{P}^{3-}$  is the *Phosphide* ion

### Keys for Naming Single Element Ions with Transition Metals (e.g. $\text{Fe}^{2+}$ , $\text{Fe}^{3+}$ , $\text{Cu}^{2+}$ ,)

When we have transition metals (always positive ions):

- write the name as found on the Periodic Table.
- write a Roman numeral in parentheses for the charge.
- write the word *ion*.

$\text{Fe}^{2+}$  is the Iron (II) ion

$\text{Fe}^{3+}$  is the Iron (III) ion.

$\text{Cu}^{2+}$  is Copper (II) ion

Note this is also done for Pb and Sn, two elements you will see often.

### Keys for Naming Polyatomic Ions (e.g. $\text{SO}_4^{2-}$ , $\text{NO}_3^-$ , $\text{CO}_3^{2-}$ )

Sorry, you just have to memorize these. Or if you are lucky your teacher will let you use [a list of them](#).

I recommend memorizing these six.

Ammonium ion:  $\text{NH}_4^+$

Hydroxide ion:  $\text{OH}^-$

Nitrate:  $\text{NO}_3^-$

Carbonate:  $\text{CO}_3^{2-}$

Sulfate:  $\text{SO}_4^{2-}$

Phosphate:  $\text{PO}_4^{3-}$

[How to Memorize the Polyatomic Ions](#)

Essential Video: [How to Name Ions](#)

[Extensive interactive practice naming ions.](#)



# Formula Writing for Ions

We must consider the *ionic charge* on each element to write the formulas for ionic compounds.

## Keys for Single Element Ions (e.g. Sodium ion)

- Write the element symbol from the Periodic Table.
- [Find the charge for the element](#) using the Periodic Table.
- Write the charge as a superscript above and to the right of the element symbol.

Sodium ion =  $\text{Na}^+$

Magnesium ion =  $\text{Mg}^{2+}$

Aluminum ion =  $\text{Al}^{3+}$

## For Single Element Ions of Transition Metals

- Write the element symbol and then write ionic charge based on the Roman Numeral in the name. For example, the Iron (III) ion would be  $\text{Fe}^{3+}$ .
- This is also done for Pb and Sn as well.

Iron (II) =  $\text{Fe}^{2+}$

Lead (II) =  $\text{Pb}^{2+}$

Copper (I) =  $\text{Cu}^+$

## Keys for Polyatomic Ions (e.g. $\text{NO}_3^-$ , $\text{PO}_4^{3-}$ , $\text{NH}_4^+$ )

- Polyatomic ions have two or more elements. They usually have a negative charge.
- Either [memorize](#) or look up on a [Common Ion Table](#).

## Essential Video: [How to Write Formulas for Ions](#)

### Practice with Video Explanations

[Extensive interactive practice writing formulas for ions.](#)

The general trend for ionic charge follows the groups on the Periodic Table.

Note that the charges for Transition Metals can vary depending on what elements they are bonded to.

For a more in-depth discussion, see:  
<https://youtu.be/M22YQ1hHhEY>



Report errors and suggestions to [DrB@breslyn.org](mailto:DrB@breslyn.org)

