

## Cations and Anions

An ion is a charged atom. The charge can be positive (+) or negative (-). There are two types of ions: Cations and Anions. Cations are ions with a positive charge ( $X^{n+}$ ). Anions are ions with a negative charge ( $X^{n-}$ ). Below is a summary. Explanations are in the following pages.

<b>Cation</b> $X^{n+}$	<p>When an atom (X) loses n electrons, it becomes positively charged ion or cation (<math>X^{n+}</math>).</p> <p><b>Equation:</b> <math>X - n e^{-} = X^{n+}</math></p> <p><b>Size:</b> The size of the cation is smaller than the size of the parent atom.</p> $X^{n+} < X$ <p><b>Name:</b> The name of the cation is the same as that of the parent element:</p> <p style="text-align: center;"><math>Na^{+}</math> is called sodium cation.</p>
<b>Anion</b> $Y^{n-}$	<p>When an atom (Y) gains n electrons, it becomes negatively charged ion or anion (<math>Y^{n-}</math>).</p> <p><b>Equation:</b> <math>Y + n e^{-} = Y^{n-}</math></p> <p><b>Size:</b> The size of the anion is smaller than the size of the parent atom.</p> $Y^{n-} > Y$ <p><b>Name:</b> The name of the anion is formed from the name of the element, but it ends with <u><i>-ide</i></u>.</p> <p style="text-align: center;"><math>Cl^{-}</math> is called chlor<u>ide</u>.</p>

## Ions

An ion is a charged atom. The charge can be positive (+) or negative (-). There are two types of ions: Cations and Anions.

Cations are positively charged ions ( $X^{n+}$ ). Example:  $Na^+$

Anions are negatively charged ions ( $X^{n-}$ ). Example:  $Cl^-$

## Why Do Atoms Form Ions?

### The Noble Gases (Group 8A or 18)

Noble gases are **stable**. They are the elements of group 8A or 18. They have 8 valence electrons (8 electrons on the outer energy level ( $n s^2, n p^6$ ), except He. They are: He, Ne, Ar, Kr, Xe and Rn. Another name for the number **8 is octet**.

### Octet Rule:

In most chemical reactions, **atoms** tend to match the S and P electron configurations of the noble gases so they can become more stable. In other words, atoms tend to have 8 electrons on the outer shell **similar to the noble gases**. This tendency is called the octet rule.

See table in the next page.