

Section 2.6 – Ions

If an atom has a different number of protons and electrons, then it has an electrical charge. This is called an **ion**.

When an atom **loses** an electron, it forms an ion with a positive charge.

2+

When an atom **gains** an electron, it forms an ion with a negative charge.

1-

Metals (left side of P.T.) tend to lose electrons and form cations.

Nonmetals (top right of P.T.) tend to gain electrons and form anions.

Main group elements tend to gain or lose electrons in order to have the same number of electrons as a noble gas.

Figure 2.15:

Elements That Form Ions with Predictable Charges

1A	2A	Transition metals						3A	4A	5A	6A	7A	8A
H ⁺												H ⁻	Noble gases
Li ⁺										N ³⁻	O ²⁻	F ⁻	
Na ⁺	Mg ²⁺							Al ³⁺			S ²⁻	Cl ⁻	
K ⁺	Ca ²⁺										Se ²⁻	Br ⁻	
Rb ⁺	Sr ²⁺										Te ²⁻	I ⁻	
Cs ⁺	Ba ²⁺												

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Transition metals form cations, but it is harder to predict their charge, and there can be more than one charge possible.

2.8: Atomic Mass

The **Atomic Mass** is the mass of one atom in amu (atomic mass units).

Definition of amu: 12 amu = the mass of a carbon-12 atom.



Chlorine - atomic mass 35.45 amu

75% - ${}^{35}\text{Cl}$

25% - ${}^{37}\text{Cl}$

For any element:

$$\text{Atomic Mass} = \sum (\text{mass of each isotope}) \times \sum (\text{natural abundance of that isotope})$$



sum for all
of the isotopes
of the element



the fraction of the
atoms of the element
that exist as that
isotope