Atoms are electrically neutral because they contain an equal number of positive protons and negative electrons. However, if an **electron is removed or added**, the atom becomes charged and is now called an **ion**.

**Cations** are formed when an **atom loses electrons** and becomes **positively charged**.
Atoms tend to lose electrons if the outermost electron shell is mostly empty. The
atom will lose all the electrons in the outermost shell so that only filled shells remain.
**Metals form cations** since they have few electrons with weal attractions in the outer shell.

**Anions** are formed when an **atom gains electrons** and becomes **negatively** charged.
This will occur if the outermost electron shell is almost full. The atom gains electrons
until the shell is filled. **All anions come from non-metallic atoms.**

**Ionic Compounds**When anions and cations combine, they
form compounds composed of large To **name an ionic compound**,
crystal lattices called ionic compounds. write the name of the cation
Examples are shown in the diagrams. followed by the anion.
 The **chemical formula** must have
**Ionic Bonding** an equal number of positive and In ionic compounds, the ions are held together by negative charges = zero charge.
the electrostatic attraction of their opposite charges.  **This electrostatic attraction is called an ionic bond. Writing Ionic Formulas**

Ionic bonds holding crystal lattices together are very
strong. Therefore, ionic compounds are usually:

* **Hard** because it takes a lot of force to break the ionic bond.
* **Brittle** because the ionic bonds hold the in fixed positions.
* **Have high melting points** because high temperatures are required
to break the strong ionic bonds and allow the ions to flow freely.

 **Ions in solution**How easily an ionic compound dissolves in water is known as its **solubility**.
**Soluble** ionic compounds dissolve in water. **Insoluble** compounds do not.
When an ionic compound dissolves in water, the water particles surround
the ions. This breaks the crystal lattice apart and prevents the ions from
re-combining. If water is remove the ions stick together and recrystallise.


**A Solution of Table Salt in Water Electrical Conductivity of Ions**

When ions are in solution they can move freely. This creates a flow of electrical charge and therefore they conduct electricity.