

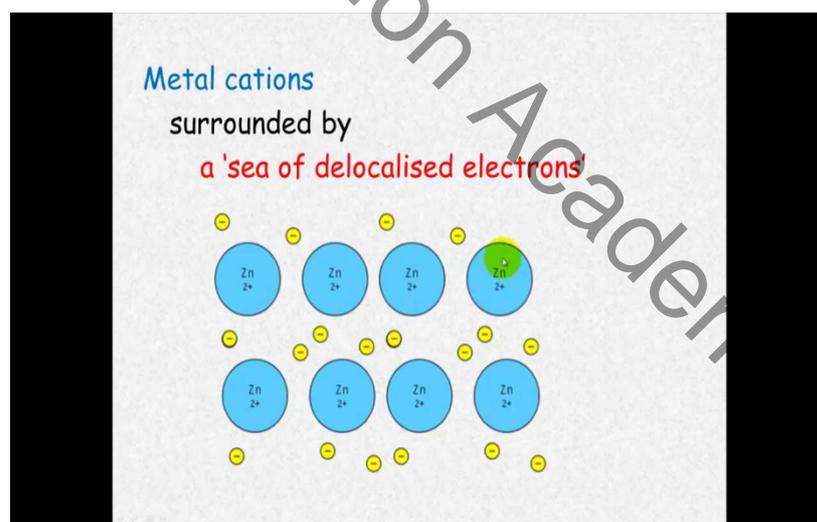
## Metallic bonding

### ► Definition

Metallic bonding is the electrostatic attraction between positive metal ions and delocalised electrons. The organization of the metal ions and the free-moving electrons give metals certain properties, such as malleability and ability to conduct heat and electricity.

### ► Structure of a metal

Metals consist of atoms arranged in neat rows or **layers**, stacked on top of one another. The outer electrons from each atom are able to abandon the nucleus and move freely throughout the metal - when this happens we say that the electrons are **delocalised**. Without the outer electrons spinning around the nucleus, each atom is now a **positive ion**. A metallic bond is the electrostatic attraction between a positive metal ion and the delocalised electrons.



### ► Properties of metal

**1- Good conductors of electricity** - remember that anything that is **charged** and **free to move** can conduct electricity. The delocalised electrons fit this criteria and it's this that makes metals such good conductors.

**2- Malleable** - a metallic lattice consists of **layers** that can **slide over each other**. This allows metals to be hammered or rolled into flat sheets without breaking.

**3- Solid at Room temperature:** Electrostatic forces between the metal ions need a lot of energy to break.

**4- Alloys are Harder than pure Metals:**

Alloys are harder than the individual pure metals from which they are made. Pure metals are soft often but when pure metals mix other element they become hard. In an alloy, the different elements have slightly different sized atoms. This breaks up the regular lattice arrangement and makes it more difficult for layers of ions to slide over each other.

