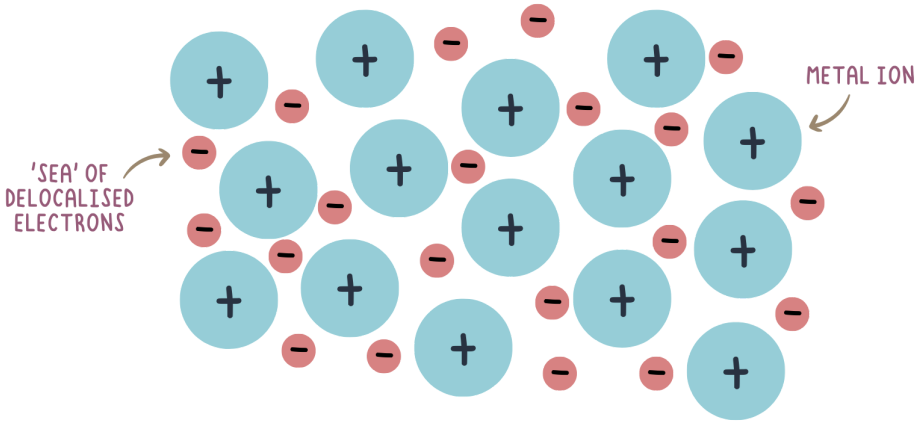
CAIE IGCSE Chemistry

2.7 Metallic bonding (extended only)

Notes

(Extended only) Describe metallic bonding as the electrostatic attraction between the positive ions in a giant metallic lattice and a 'sea' of delocalised electrons

- Metallic bonds are the electrostatic attraction between the positive metal ions (cations) in a giant metallic lattice and a 'sea' of delocalised electrons
- Metals consist of giant structures of atoms arranged in a regular pattern.
- The electrons in the outer shell of metal atoms are delocalised and so are free to move through the whole structure.



(Extended only) Explain in terms of structure and bonding the properties of metals

Metals have giant structures of atoms with strong metallic bonding. Therefore, most metals:

1. Can **conduct electricity** because of the delocalised electrons in their structures. Conduction depends on the ability for electrons to move throughout the metal.
2. **Malleable and ductile** because the layers of atoms in metals are able to slide over each other, so metals can be bent and shaped.
    - Metals can be mixed with other metals/materials to become alloys which are much harder and won't bend since the different sizes of atoms will distort the layers so that they cannot slide past each other
3. (Have **high melting and boiling points** due to strong electrostatic attraction between negatively charged electrons and positive metal ions, so require more energy to overcome the strong metallic bonds.)