

MSJChem

Tutorials for IB Chemistry

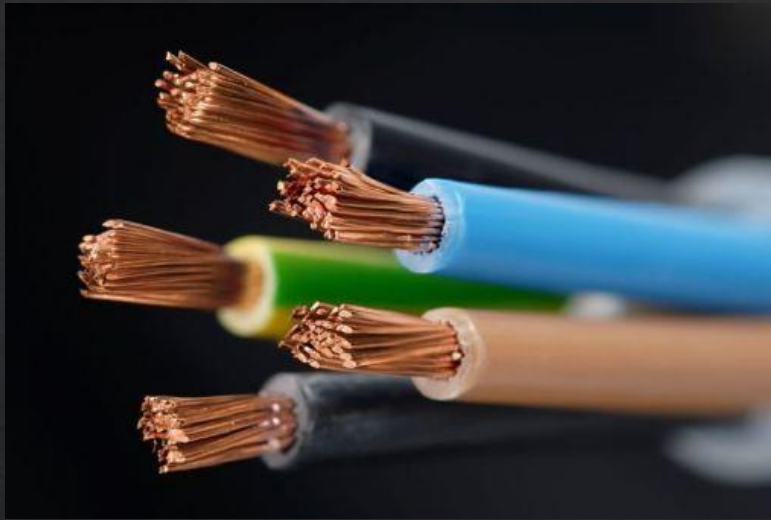
Structure 2.3

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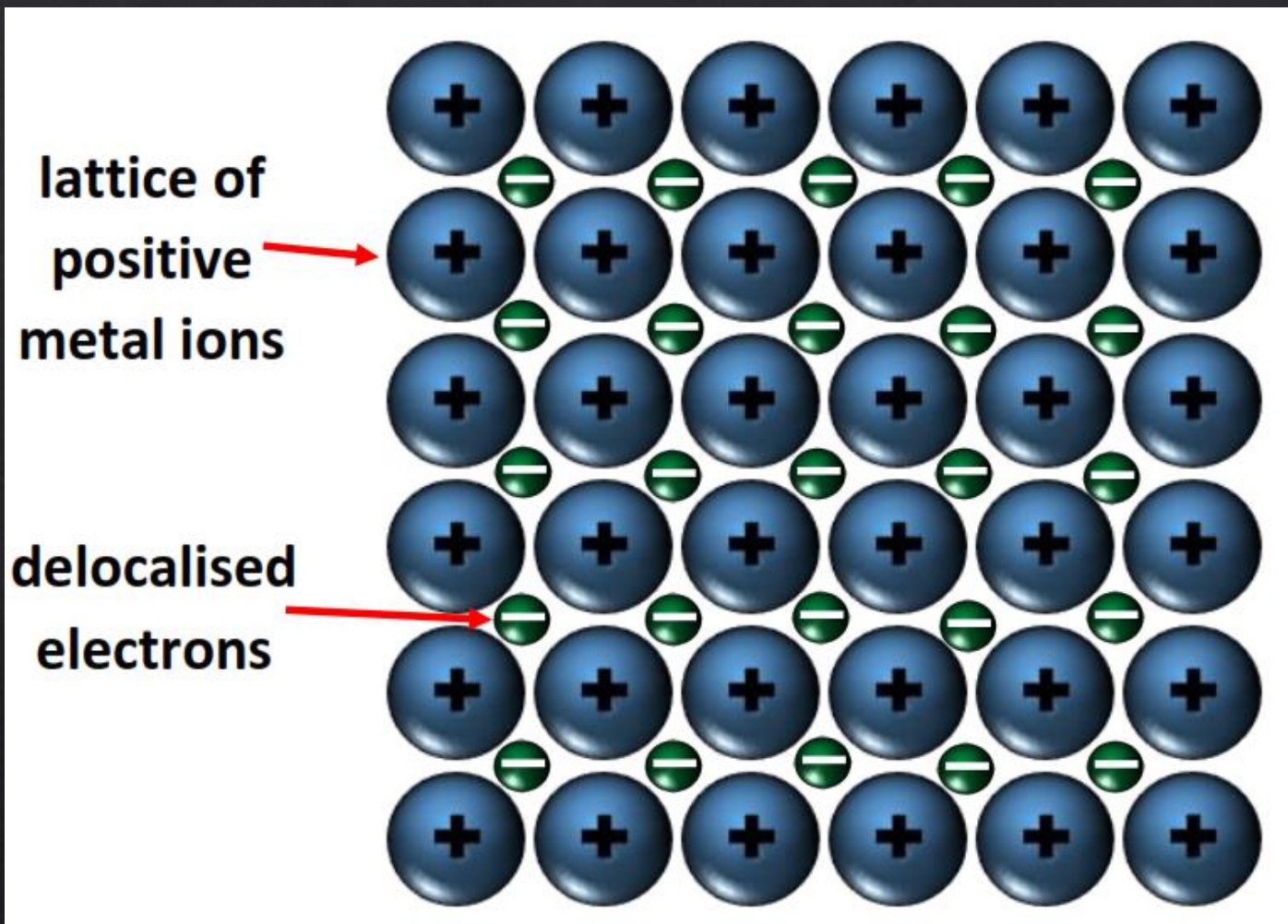
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Metallic bonding

Metallic bonding

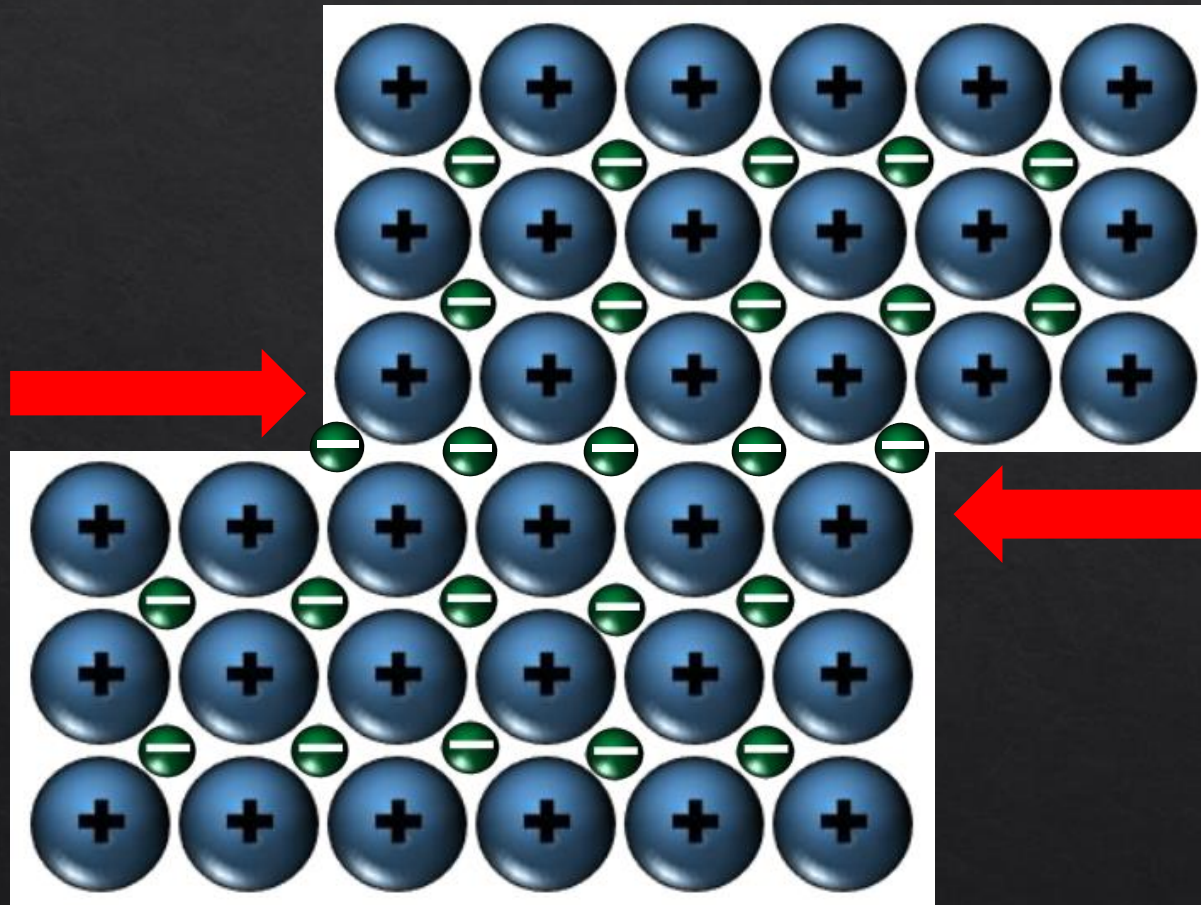


Metallic bonding



The metallic bond is the electrostatic attraction between a lattice of positively charged metal ions and delocalised electrons.

Metallic bonding



Metals are malleable and ductile – the layers can slide over each other when metals are bent, hammered, or stretched, without breaking the metallic bond.

Metallic bonding

Metals are good conductors of electricity because of the delocalised (mobile) electrons within the structure that move when a voltage is applied.

Metals are malleable (can be bent into shape) and ductile (can be drawn into wires) – the metallic bond remains intact even if the structure is distorted.

Metals are shiny – the delocalised electrons in the metallic structure reflect light.

Metallic bonding

The strength of the metallic bond is determined by the charge on the metal ion and the ionic radius of the metal ion.

Ion	charge on ion	ionic radius ($\times 10^{-12}$ m)	melting point ($^{\circ}\text{C}$)
Na^+	1+	102	98
Mg^{2+}	2+	72	650

Metallic bonding

Group 2 metals have higher melting points than group 1 metals.

This is because they have more delocalised electrons which increases the strength of the metallic bond and results in a higher melting point.

Transition elements have delocalised d electrons which increase the strength of the metallic bond and the melting point of the metal.

The delocalised d electrons also contribute to the electrical conductivity of the transition elements.