

CAIE IGCSE Chemistry

9.5 Corrosion of metals

Notes

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State the conditions required for the rusting of iron and steel to form hydrated iron(III) oxide

- Rusting is an oxidation reaction
- Steel and iron will rust in the presence of water and oxygen
- Iron will react with oxygen and water to form hydrated iron (III) oxide
 - Iron + Oxygen + Water → Hydrated Iron (III) oxide

State some common barrier methods, including painting, greasing and coating with plastic

- To prevent iron and steel from rusting, there are various barrier methods such as:
 - Painting
 - Greasing
 - Coating with a layer of plastic
 - Oiling
 - Galvanising

Describe how barrier methods prevent rusting by excluding oxygen or water

- Barrier methods prevent iron and steel from rusting by preventing the metals from becoming in contact with oxygen and water
- Rusting cannot occur without these two conditions because it is an oxidation reaction

(Extended only) Describe the use of zinc in galvanising as an example of a barrier method and sacrificial protection

- Galvanising is the process in which a metal, such as iron and steel, is coated with a thin layer of another metal, such as zinc, to prevent it from corrosion or rusting
- Galvanising is another example of a barrier method as oxygen and water will not come into contact with the iron or steel underneath the protective coating
- Sacrificial protection is when metals higher in the reactivity series, such as zinc, are used to form a protective layer on the surface of metals that are lower in reactivity.
 - This is because zinc is more reactive than iron so will be more likely to be oxidised and lose electrons to form its positive ions, so iron will be less likely to be oxidised



(Extended only) Explain sacrificial protection in terms of the reactivity series and in terms of electron loss

- Sacrificial protection is when metals higher in the reactivity series, such as zinc, are used to coat metals lower in reactivity, such as iron.
 - This is because metals that are more reactive than iron will be more likely to get oxidised and lose electrons to form its positive ions, so iron will be less likely to oxidise

Most reactive

Potassium

Sodium

Calcium

Magnesium

Aluminium

(Carbon)

Zinc

Iron

(Hydrogen)

Copper

Silver

Gold

Least reactive

