



Dry Cell & Fuel Cell

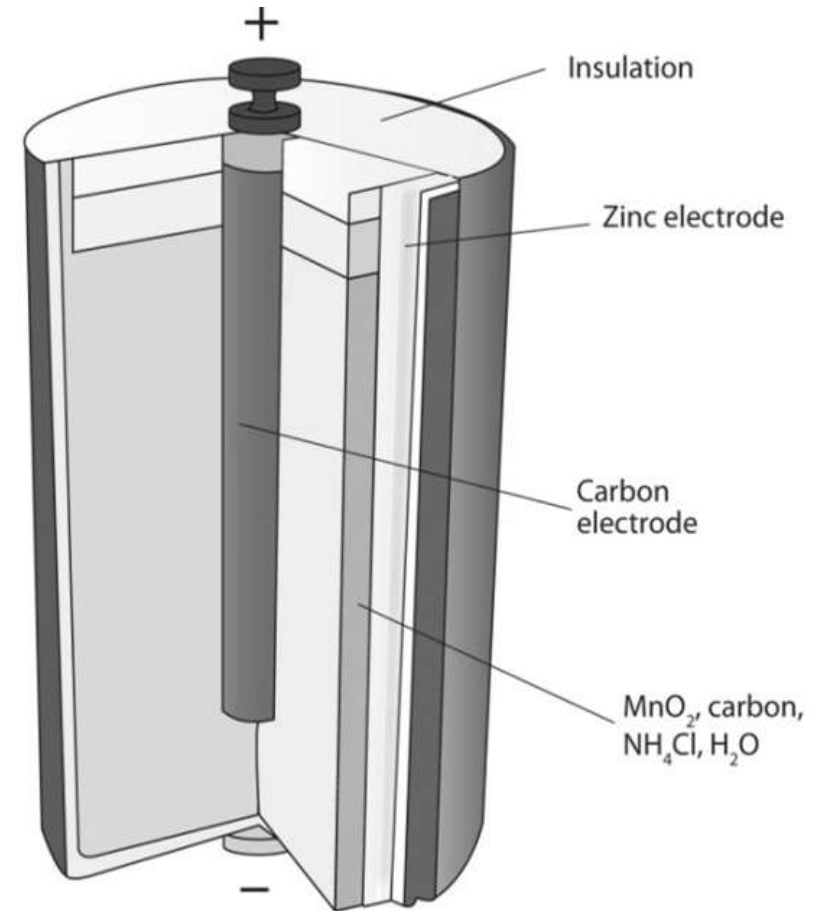
DRY CELL

Structure & Chemistry



Structure of the Dry Cell

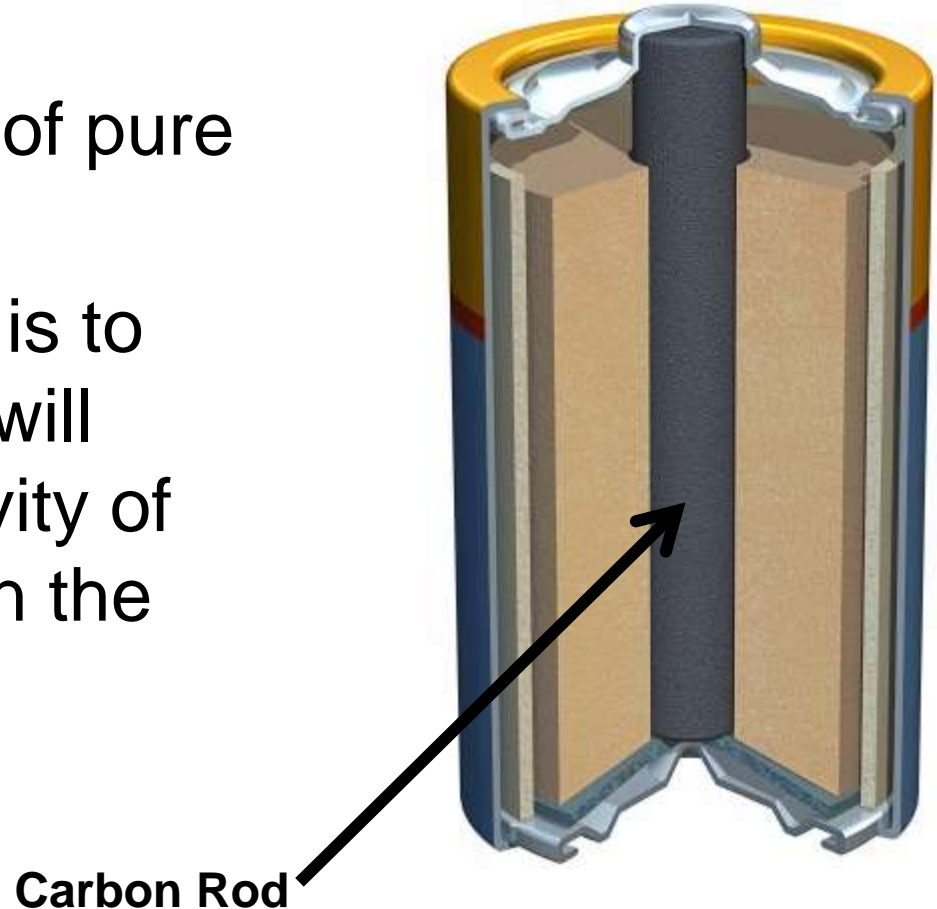
- The dry cell is a **electrochemical** cell
- It uses a low moisture electrochemical electrolyte [most cells have a liquid electrolyte].
- Because of this characteristic, dry cells are less prone to leaking and are suitable for portable applications.
- The dry cell consists of three main components and this will be outlined in the following slides...



Components of the Dry Cell

■ Carbon Rod

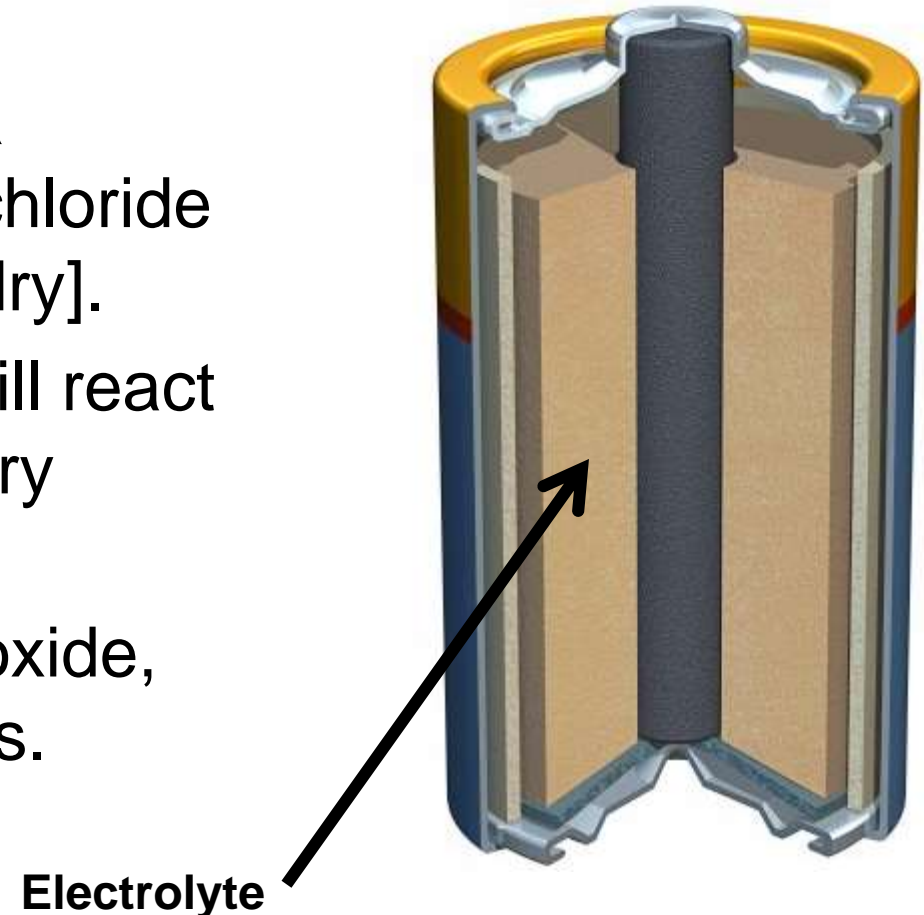
- The centre of a dry cell is a rod of pure carbon in the form of graphite.
- The **purpose** of the carbon rod is to allow the flow of electrons [this will increase the electrical conductivity of the manganese dioxide & retain the moisture of the electrolyte]



Components of the Dry Cell

■ Electrolyte

- The carbon rod is surrounded by a **electrolytic paste** of ammonium chloride and zinc chloride [not completely dry].
- The ammonium ion in this paste will react with the manganese dioxide to carry electrons to the carbon rod.
- This will produce dimanganese trioxide, water and ammonia as by-products.

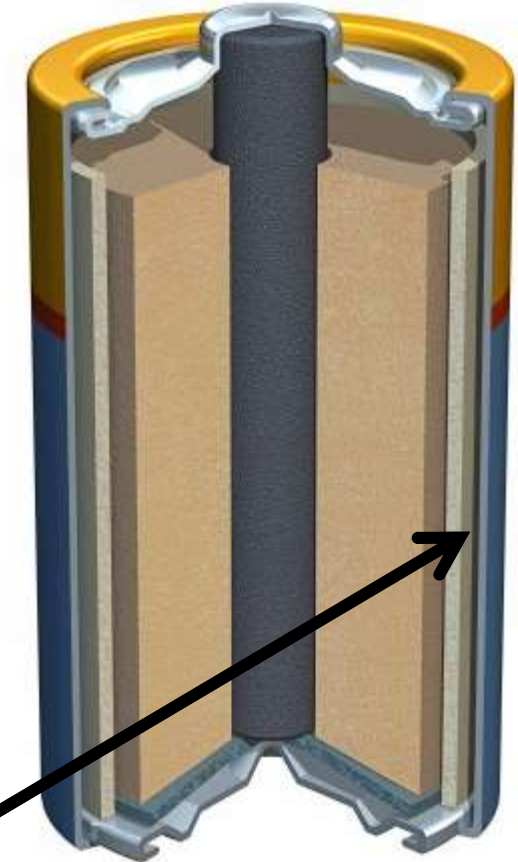


Components of the Dry Cell

■ Zinc Sleeve

- The electrolytic paste is covered in a sleeve of zinc metal.
- These electrons will **flow** through the electrolyte into the carbon rod to produce an electrical current.
- The sleeve will then get thinner as the zinc oxidizes and the battery will no longer be able to conduct electricity once the zinc sleeve is completely gone.

Zinc Sleeve



Chemistry of the Dry Cell

- The dry cell is involved in **many reactions** and these reactions will be outlined below;
- The outer zinc casing in the dry cell is the **anode (-)**. Then zinc will oxidise as shown to the reaction below;



Chemistry of the Dry Cell

- In the dry cell, the carbon [graphite] rod contains manganese dioxide which is the **cathode (+)** – this is shown in the reaction below;



- The manganese dioxide paste contains ammonium chloride and zinc chloride which act as an **electrolyte**.
- These ammonium ions provide the hydrogen ions needed for a cathode process;



COMPARISON

Of the Fuel Cell & the Dry Cell



In terms of Chemistry



Dry Cell

- Dry cells are electric cells in which the electrolyte is absorbed in a solid to form a paste.
- The dry cell [alkaline cell] consists of electrolytic powder anode and a carbon rod which serves as the inert cathode.
- This allows electrons to flow through to the aqueous solution paste of ammonium chloride and zinc chloride.



Fuel Cell

- Fuel cells chemically combine hydrogen with oxygen to make electricity without involving heat.
- Fuel cells are electrochemical energy converters. They directly convert the energy of a chemical reaction into electrical energy, without a thermal electric intermediate step.

Cost & Practicality

Dry Cell



- Very cheap
- Small and easy to store and use
- Maintains a steady voltage, therefore they are good for a range of electronic devices
- Cannot be recharged
- Short life
- Cannot deliver a high current

Fuel Cell



- very costly - \$1000 for every kilowatt of power they generated
- Reliable and Efficient (50%-90% presently)
- Heat generated can be captured for other uses
- Operates cleanly (emits only water)

Impact on Society

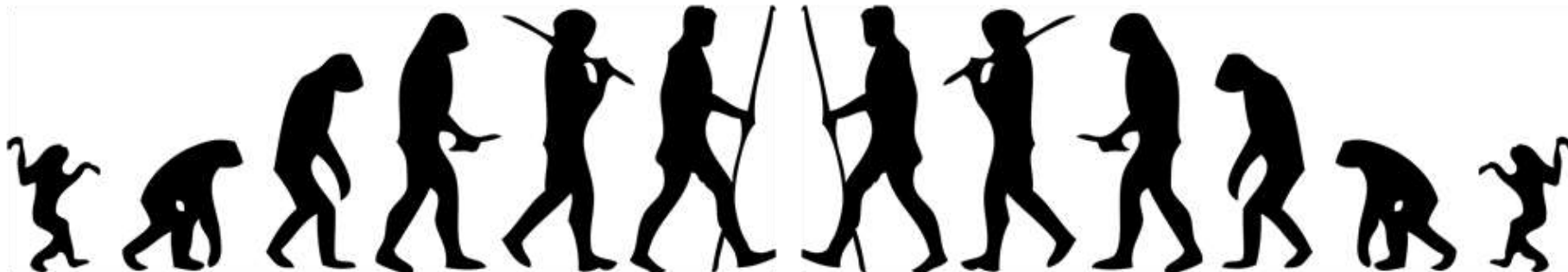


Dry Cell

- Because of its low constant voltage, it is used for common appliances
- As for its mobility, portable items like flashlights could be used. Hence, increasing the development of electrical devices

Fuel Cell

- Very reliable and efficient hence convenient impact on society
- Widely used especially in the car industry
- Can be a answer to dependency upon fossil fuels



Environmental Impact



Dry Cell

- Large amounts of zinc can become a threat to the environment.
- Dispose of Manganese in large quantities are not beneficial for the environment



Fuel Cell

- environmentally-friendly alternative to conventional fossil fuels

Thank you for Listening ~!

