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Technical report writing

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1 Introduction

This report is an investigation into the development of batteries. How the battery was invented, the current versions of batteries we have in today's age and what the future holds. The report will also discuss the importance of the battery in everyday usage and the possible effects it may have to the planet.

1.1 Aims

The aim of this report is to outline the importance of battery development. How batteries have helped improve on the number of appliances we can use on an everyday bases, from electrical toothbrushes to electrical cars. This report will also highlight the possible effects we come across when using modern batteries and how we can minimise the risks caused.

1.2 Objectives

This report will explain why battery development usage is important and how it helps appliance faction and the contribution that they can make towards improving air quality in towns and cities.

2 Evolution of the battery

“A battery is a device that holds electrical energy in the form of chemicals. With the help of an electrochemical reaction, it converts stored chemical energy into direct current (DC) electrical energy.”

The evolution of the battery began in the year 1749 when Benjamin Franklin first coined the term “battery”. Franklin was said to have been experiment with electricity using a set of linked capacitors. “Franklin also discovered the difference between conductors and insulators of electricity. He used a device called a Leyden jar to hold and discharge electricity. Wiring together charged plates, and later jars, he created and named the first electrical battery.”

Fast forward a few years in the 1790’s an Italian physicist by the name Alessandro Volta developed the first operable battery. Volta managed to create the battery by using alternating disks made from zinc and silver, or alternatively copper and pewter. Volta used either paper or cloth which was then soaked in either salt water or sodium hydroxide to separate the alternating disks. This version the battery was given the name voltaic column or the voltaic pile. The voltaic pile quickly became the primary power source in laboratories for experiments. William Nicholson an English scientists used the voltaic pile to electrolysis water for the first time, shortly after Volta publicised his findings. For Alessandro Volta’s invention “The Austrian emperor Francis, made him director of the philosophical faulty at the University of Padua in 1815. The volt, a unit of the electromotive force that drives current, was named in his honour in 1881.”

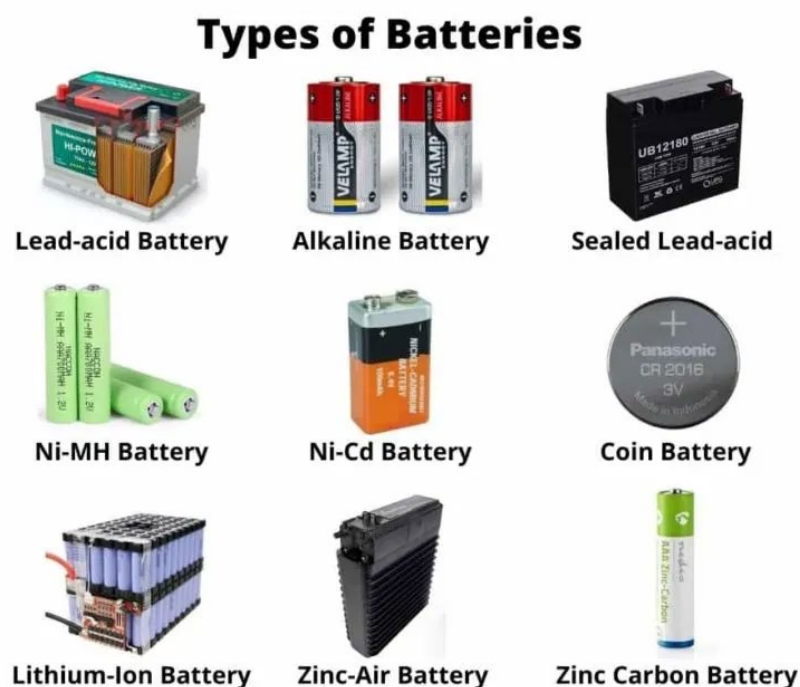
2.1 Visual image of the Voltaic Pile



3 Modern day batteries

The batteries we currently use vary from voltage capacity, size and usage. Small sized batteries relatively have a smaller voltage output. These types of batteries are used for devices such as smoke detectors, alarms, watches, or calculators. Whereas larger sized batteries with larger voltage output are used for appliances which are much bigger such as vehicles (motorbikes, cars and trucker etc).

3.1 Visual image of the current types of batteries we currently have.



3.2 Battery types

- A **Lead-acid battery** is a form of a rechargeable battery. Lead acid batteries are cheaper and power the lighting in most cars and vehicles etc . Lead-acid batteries have lower energy density than modern rechargeable batteries and contain up to 24V (volts).
- An **alkaline battery** is also a form of a rechargeable battery. Alkaline batteries transfer chemical energy into electrical energy by using manganese dioxide as a positive electrode, and a zinc cylinder as a negative electrode to power an outer circuit. Alkaline batteries are made to retain its full strength after recharging. They used for electrical device like digital cameras etc and have a voltage of up to 1.6.

- A **sealed lead-acid battery** is design by thickening sulphuric acid electrolyte to stop the battery from exhausting quickly. Sealed lead-acid battery is made to last for just over 10years. These types of batteries are used to run wheelchairs etc. It can reach a voltage level of 12.9.
- **Nickel-metal Hybrid Batteries (Ni-MH)** are rechargeable and designed so the negative electrodes use a hydrogen-absorbing alloy as a replacement for cadmium. These types of batteries are used on devices like laptops etc. They are good for these types of devices because the have a lower but consistent cell voltage.
- **Nickel-cadmium Batteries (Ni-Cd)** is also a rechargeable battery. This battery is designed by using nickel oxide hydroxide and the metal cadmium as electrodes. These types of batteries are not commonly used but when used you would typically find them in toys etc. These batteries have a discharge of up to 1.2v.
- A **Coin cell battery** is a small single-cell battery, it is a cycler sharp similar to a button. These types of battery are not rechargeable but have a long-life span. You can typically find these types of batteries in watches etc.
- **Lithium-ion Batteries (Li-ion)** consist of cells where lithium ions move from the negative electrode through the electrolyte to the positive electrode in flow and back when charged. Lithium-ion batteries are used in big electrical currents appliance such as solar power storage and have big voltage
- **Zinc-air Batteries** normally run by using oxidizing zinc with oxygen from the air. These batteries are ready to use as soon as air is in direct contact with the zinc in the battery. Zinc air batteries come in several sizes and are used in different appliances, but famously used for hearing aids. These batteries are not rechargeable and have high energy density.
- **Zinc Carbon Batteries** supplies a direct electric current from the electrochemical reaction between zinc and manganese dioxide when an electrolyte is presence. These types of batteries are also found throughout everyday home appliances like alkaline batteries, they are used for devices like tv remotes. They are not rechargeable and have a short life span.

4 The future of batteries

We have come a long way from the voltaic pile to having different type of batteries with several sizes and usages. The goal for the future is to development a battery less harmful to the environment. We can archive this by following the required recycling process of empty or blown out batteries because if not recycled properly they can end up in landfills leading to water and air pollution. We can also reduce risk by opting to use rechargeable batteries rather then one time use batteries.

5 Discussion

Research show that batteries are very useful in current times. You do not need to be an engineer nor a scientist to come across batteries, like documented in the 18th century. Nevertheless, working on developing a safe but more harmless battery to the environment is yet to come and would help keeping the environment clean and will not contribute to the pollution.

6 Conclusion

In conclusion Battery technology development has been evolutionary and is very important in the functioning of people's lives. This is evidential in testimonies of the numerous usages of the modern battery.

7 References

The engineers Post team (November 2022) 9 DIFFERENT TYPES OF BATTERIES AND THEIR APPLICATIONS [PDF]. Available at: <https://www.theengineerspost.com/types-of-batteries/#:~:text=Types%20of%20Batteries%201%20%231%20Lead-acid%20Batteries%20Image%3A,...%208%20%238%20Zinc-air%20Batteries%20...%20More%20items> (Accessed 27 November 2022).

AMERICAN PHILOSOPHICAL SOCIETY (November 2022) the amazing of Benjamin Franklin (the battery). Available at: https://content.time.com/time/specials/packages/article/0,28804,2012113_2011976_2011964,00.html (Accessed 25 November 2022).

The Editors of Encyclopaedia Britannica (September 2022) Britannica (Alessandro Volta). Available at: <https://www.britannica.com/biography/Alessandro-Volta> (Accessed 25 November 2022).

