



## 23CHT101-Engineering chemistry

### UNIT-III ENERGY STORAGE DEVICE

#### INTRODUCTION

Batteries are energy storage devices that convert chemical energy into electrical energy, playing a vital role in powering modern technology. From the smallest household gadgets like remote controls and smart phones to large-scale applications such as electric vehicles and renewable energy systems, batteries have become an essential part of daily life.

First invented in the late 18th century, the fundamental concept of batteries has developed significantly. Today's batteries come in various forms, including alkaline, lithium-ion, lead-acid, and more, each designed to meet specific energy demands. While some are single-use (non-rechargeable), others can be recharged multiple times, making them suitable for devices that require long-term energy use.

#### Objectives and Purposes

What are the different types of batteries commonly used today?

What are the main applications of batteries in everyday life?

How do batteries affect the environment throughout their lifecycle?

What are the most effective methods to extend the life of a battery?

How can batteries be recycled or disposed of safely and effectively?

What are the emerging technologies and innovations in battery design and performance?

What are the important requirements of a battery?

What are the differences between Chargeable (Primary) and Rechargeable (Secondary) Batteries?

#### 1. What are the different types of batteries commonly used today?

- **Alkaline Batteries:** Widely used in household items like remote controls and toys. Known for long shelf life but not rechargeable.



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- **Lithium-Ion Batteries:** Commonly found in smartphones, laptops, and electric vehicles. Rechargeable, with high energy density and longer life.
- **Lead-Acid Batteries:** Mostly used in cars, motorcycles, and backup power systems. Rechargeable, but heavier and less energy-dense.
- **Nickel-Cadmium (Ni Cd) Batteries:** Used in older rechargeable applications like power tools.
- **Zinc-Air Batteries:** Used in hearing aids, watches, and specialty devices. Zinc-air batteries are particularly known for their light weight and long shelf life.