ENGINEERING CHEMISTRY

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Energy storage devices - Batteries

Class content:

- ***Battery Characteristics(contd.)***
  - ***Energy efficiency***
  - ***Shelf life***
  - ***Tolerance to service conditions***
  - ***Power density***
  - ***Energy density***

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Energy Storage devices- Batteries

Energy efficiency:

$$\text{Percentage of Energy efficiency} = \frac{\text{Energy released on discharge}}{\text{Energy required for charging}} \text{ x } 100$$

- Depends on efficiency of electrode reactions

Shelf life:

- Maximum time for which a battery can be stored without loss of performance
- Low shelf life due to **self-discharge**

Tolerance to service conditions:

- The battery has to be tolerant to different service conditions such as variation in **temperature, vibration and shock**

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Energy Storage devices- Batteries

Energy density:

$$\text{Energy density} = \frac{\text{Energy available from the battery}}{\text{Mass of the battery}}$$

$$\text{Energy density} = \frac{i \times E_{cell}}{W} \times t$$

where W is mass of the battery, i and E_{cell} are current and EMF and t is time

- **watt-hr/kg**

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where W is mass of the battery, i and E_{cell} are current and EMF

- **watt/kg**

THANK YOU

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