National Transportation Safety Board

Primer on Lithium Ion Battery Technology

What is a Battery:

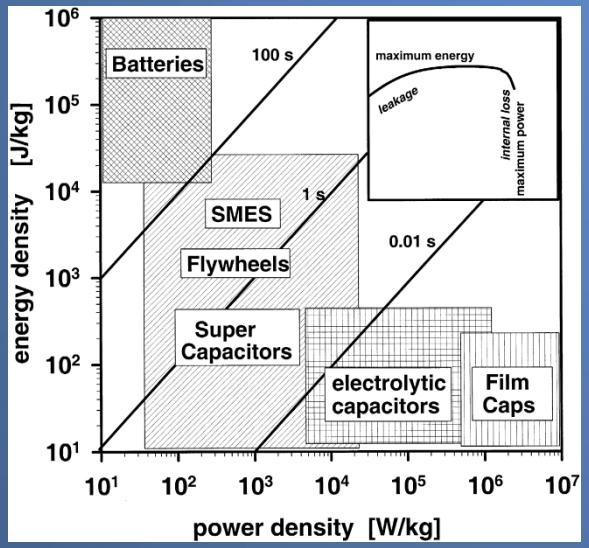
- A battery is an energy storage device that relies on electrochemical reactions to deliver energy
- Batteries enable energy portability such as powering a radio or an automobile
  - http://en.wikipedia.org/wiki/Battery_(electricity)
  - http://www1.eere.energy.gov/vehiclesandfuels/technologies/energy_storage/batteries.html
  - http://batteryuniversity.com/learn/article/sharing_battery_knowledge
  - http://en.wikipedia.org/wiki/Lithium-ion_battery

What is a Battery:

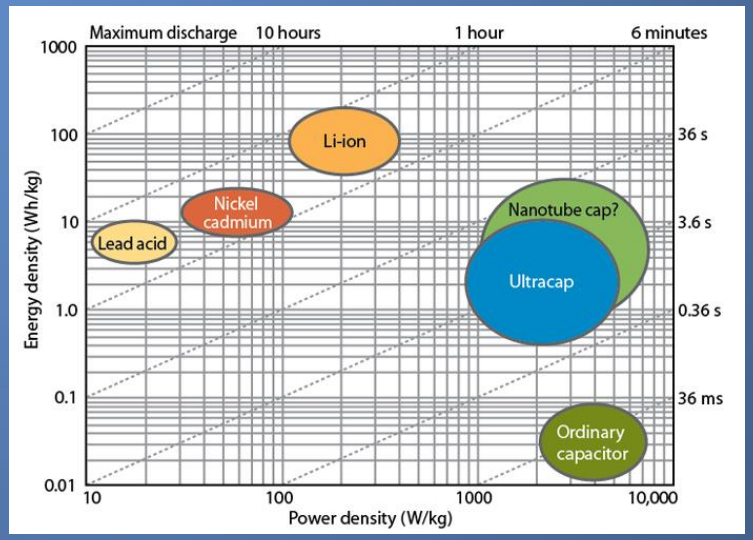
- There are many different types of batteries
- Examples of battery compositions include
  - Lead-acid (typical automobile battery)
  - Nickel-metal hydride (power tool battery)
  - Nickel-cadmium (camera battery)
  - Lithium-ion (cell phone and laptop battery)
- Batteries of different chemical composition can have significantly different ability to store and discharge energy

What is a Battery:

- The graph on the left compares the storage and discharge capability of batteries to other types of devices
- Lithium-ion batteries offer relatively high energy and power density compared to other battery types, as shown in the graph on the right.



Journal of Power Sources, 91, 2000 pp.210–216



http://electronicdesign.com/boards/innovators-tackle-r-l-and-c-enhance-fundamental-building-blocks

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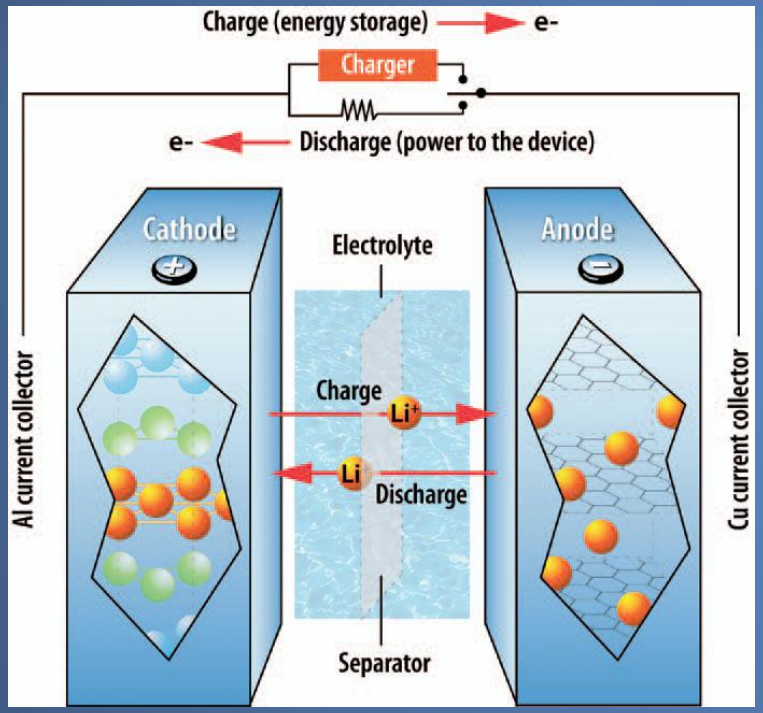
Lithium-Ion Battery Technology:

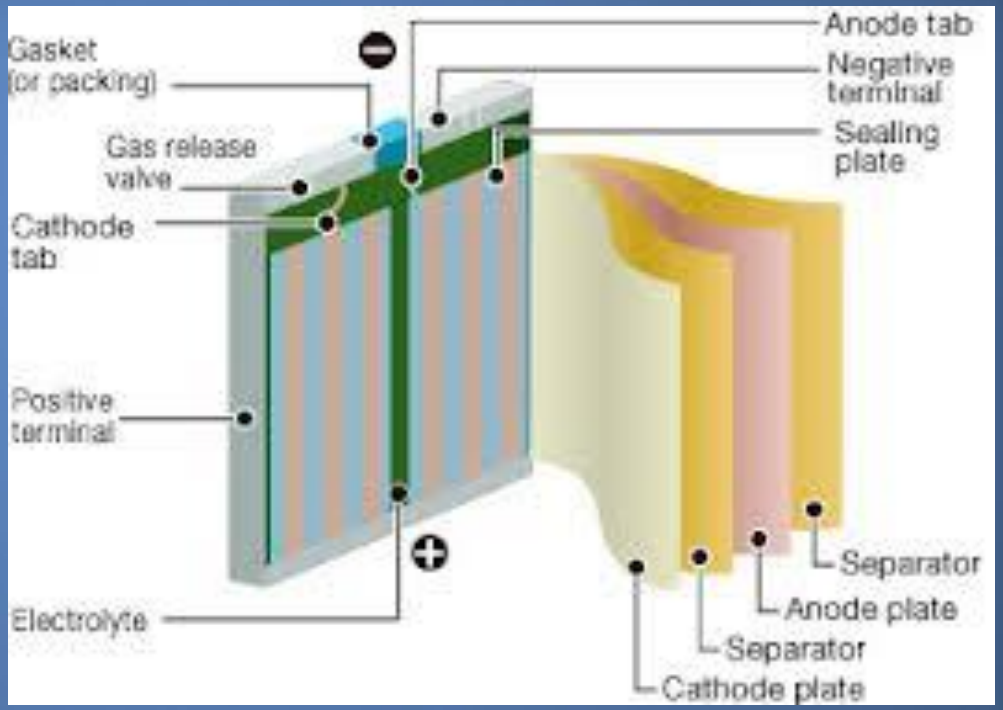
- A few videos explaining how lithium-ion batteries function
  - http://www.youtube.com/watch?v=dAXoBfEVqTg
  - http://www.youtube.com/watch?v=2PjyJhe7Q1g

Lithium-Ion Battery Technology:

- Diagrams of lithium-ion batteries



http://www1.eere.energy.gov/vehiclesandfuels/pdfs/pir/vtp_goals-strategies-accomp.pdf



http://www.daikin.com/csr/feature2009/02_2.html

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