Recycling Lithium Ion Batteries: Impediments and Opportunities on Campus

The Great Problem Seminar: Recover, Reuse & Recycle
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Abstract

Lithium-ion batteries (LIBs) are rechargeable and are in most portable appliances and electric vehicles. Although rechargeable, after about 1,000 charging cycles LIBs are unusable. Currently only 10% are recycled in the U.S. Our group raised awareness of this on WPI’s campus, influencing thousands of people to recycle their LIBs.¹ ²

Methodology

1. A short survey was distributed amongst 300 random WPI students
   Results:
   - Over half of WPI’s student body did not know what LIBs were
   - Almost three quarters did not know where LIBs could be recycled on campus

2. A flyer was designed to improve awareness and recycling rates
   - Placed in commonly visited areas
   - Made ‘recycling bins’ presence known
   - Also displayed on WPI social media pages and dining hall televisions
   - Information put into chalk messages on walkways

Results and Future Proposals

- A follow-up survey was redistributed to another 300 random students after two weeks of utilizing methods
  Results: (Assuming 5,000 student population)
  - Over 2,500 students influenced by our ads
  - 20% decrease in students who knew nothing about LIBs
  - 1,800 people now know where to recycle their LIBs at WPI
  - 1,000 less people plan to put their next LIB into a landfill

Background

- Invented in the 1980s
- Used in portable electronic devices and electric vehicles
- Rechargeable properties
- Reduced size and weight compared to previous options
- Commercialization in 1991 ³ ⁴

Steps to Recycle

- Shred into workable form
- Sieve powders
- Density separation of large metals
- Magnetic separation
- Dissolve aluminum in NaOH
- Begin Leaching ³ ⁴

Bibliography:
7. Wobbe, Kristin, and Elizabeth Tomaszewski. “LIB Information in NSO.” E-mail interview. 2–3 Dec. 2015.