LITHIUM-ION BATTERY RECYCLING PRIZE

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Submission Title:	Battery Self Cooling for Safe Recycling
Submission Track:	Track 3: Safe Storage and Transportation

A Public Document

Optional Image

Concept

- Safe and cost-effective storage and transportation of Li-ion batteries are important for recycling yet difficult. This proposal aims to render LIBs electrochemically inactive while keeping them cool through low-cost self-cooling. Remaining electric energy from recycled batteries is recovered to cool the batteries and reduce their state of charge (SOC). The synergized effects of low temperature and low SOC would prevent battery thermal runway during storage or transportation.

Approach

- A safety storage/transportation box consists of battery discharger, a thermoelectric (TE) cooler,
- Remaining electric energy from recycled batteries is recovered by discharging the batteries;
- Recovered energy is used to drive a TE cooler;
- The TE cooler keeps battery and the box cool during discharge;
- Thermal insulation and storage layer of the box keep batteries inside the box cool during storage and transportation.
- The box full of recycled batteries can be removed from battery feeding tube, discharging circuit and TE cooling unit for compact and easy transportation.

Potential Impact

- It would greatly enhance safety of Li-ion battery during storage or transportation for recycling.
- The safety box is self-powered thus does not need external power supply.
- Low cost design and operation makes it easy to be adopted.
- Removable design makes transportation easy and low cost.
- It would contribute to greatly enhance recycling rate of Li-ion batteries.