Innovation Center for Battery500

U.S. DEPARTMENT OF ENERGY
Energy Efficiency & Renewable Energy

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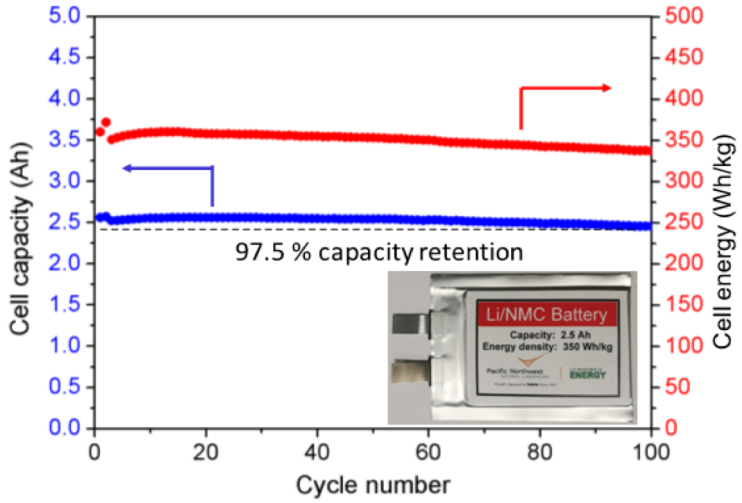
Objective:

- The project aims to develop commercially viable lithium (Li) battery technologies with a cell level specific energy of 500 Wh/kg through innovative electrode and cell designs that enable the extraction of the maximum capacity from advanced electrode materials. In addition, the project aims to achieve 1000 cycles for the developed technologies.

Impact:

- The results of this project will be used for the development of technologies that will significantly increase the energy density, cycle life and reduce the cost of rechargeable batteries for electric vehicles.

Battery500 team delivered a 2.5 Ah Li||NMC pouch cell having a specific energy of 350 Wh/kg and achieved 97.5% capacity retention after 100 cycles



Accomplishments:

- Localized high concentration electrolytes (LHCE) have been developed with improved thermal stability and high CE in Li||NMC811 coin cells.
- A one-dimensional model is developed to describe the Li metal deposition process.
- Li-NMC pouch cells with greater than 350 Wh/kg specific energy and over 100 cycles have been demonstrated and the cells are still cycling.
- 375 Wh/kg Li-S pouch cells have been prepared with thick electrodes. The capacity fading mechanisms of the pouch cell has been evaluated using a combination of in-situ and ex-situ techniques.

FY 19 Milestones:

- Synthesize NMC with Ni > 90% and capacity of > 210 mAh/g.
- Implement lithium protection to improve cycle life by 20%.
- Fabricate and test a pouch cell capable of 350 Wh/kg and 250 cycles
- Develop and test a pouch cell reaching energy density of 400 Wh/kg and 30 cycles .

FY19 Deliverables:

- Quarterly reports and 1 Ah Li metal pouch cell with 400 Wh/kg and over 30 charge-discharge cycles.

Funding:

— FY19: $8,000,000, FY18: $8,000,000, FY17: $8,000,000