The Incorporation of Graphene to $LiCoO_2$ as a Cathode to Improve the Performance of LIBs

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Background/Relevance

- Electric cars has huge potential in the future, but current Lithium-ion batteries have not enough capacity used in electric cars.
- Graphene has been widely used in several fields, and it shows great improvements to different applications.

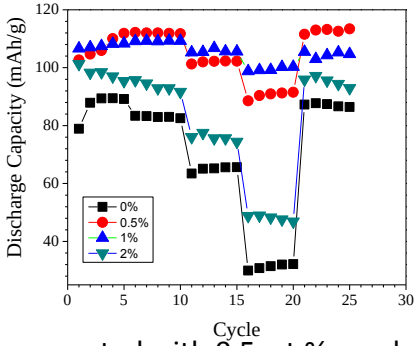
Innovation

- Incorporating graphene into cathode materials to test the performance of cathode.

Approach

- Pristine cathode and cathode incorporated graphene were prepared first.
- Many "half-cells" were assembled in the glove box.
- The electrochemical impedance spectroscopy measurements for "half-cells" were achieved using a CHI660D Analyzer.
- Full cycles of charging and discharging of sample cells were finished using a BT2000 Battery Tester.

Key Results



- Samples incorporated with 0.5 wt.% graphene sample has the largest discharge capacity compared with other samples.
- Samples incorporated with 1 wt.% graphene show the most stable discharge capacity compared with other samples.
- The incorporation of 2 wt.% graphene enhance the performance of cathode.

Conclusions

- The incorporation of graphene enhance the battery performance with a $LiCoO_2$ cathode.

Future Work

- Further work could focus on adding higher weight percentages (>2 wt.%) of graphene powder into cathode materials to analyze the connection between different weight percentages of graphene powder added and the performance of lithium ion batteries.