

Pre-Lithiation Electrolyte Additive For Li-Ion Batteries (OTT ID- 1582)

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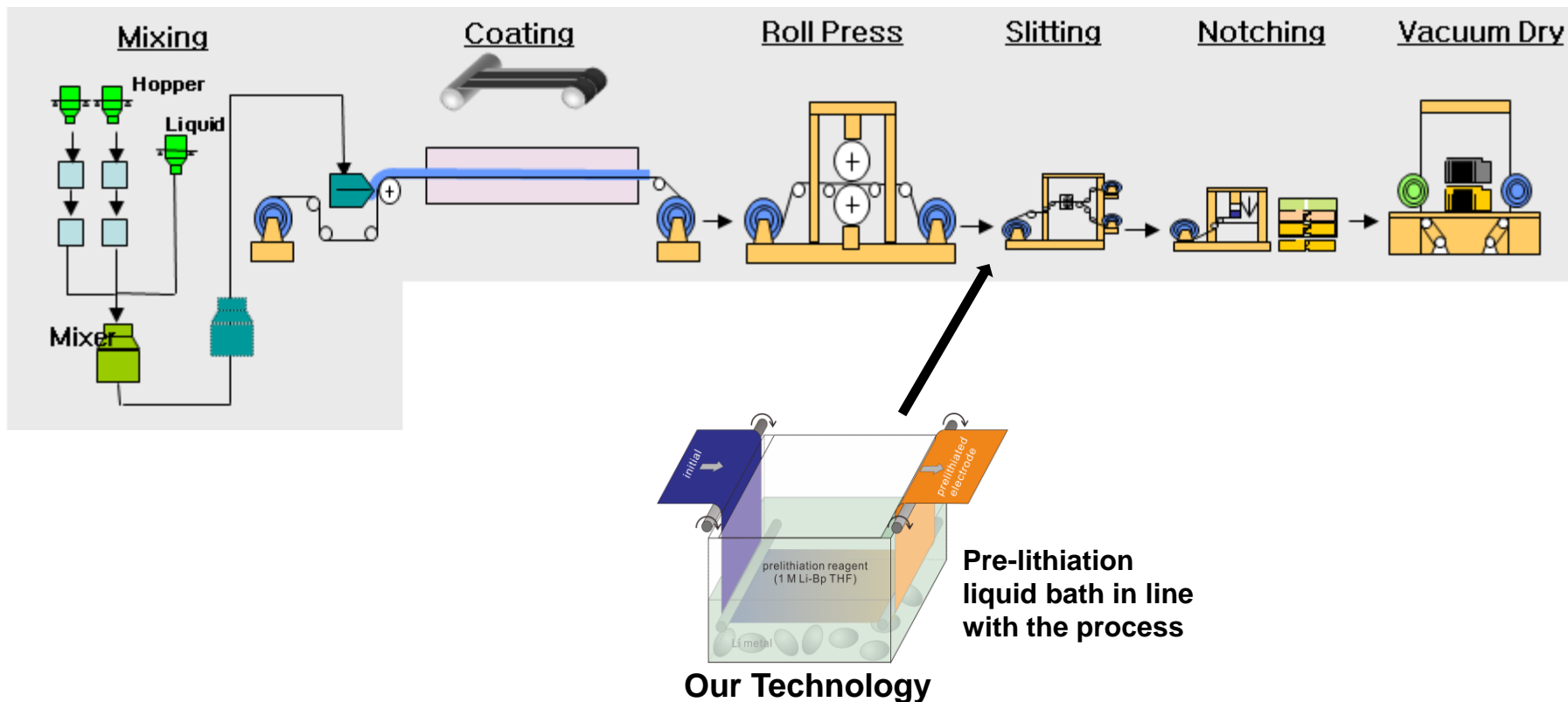
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- ❑ Current growing demands in energy require a multifaceted energy infrastructure
- ❑ 10 to 30% of energy is wasted in the state-of-art production technology
- ❑ Traditional batteries operate at low potential favoring grid storage, but offer relatively low energy density required for electric cars and longer usage

- ❑ Increase the existing Lithium-ion batteries energy (carbon anode) up to 30%
- ❑ Cheaper high energy material. For e.g. silicon oxide which is a production waste from semiconductor production
- ❑ Proposed technology can be seamlessly incorporated in the existing manufacturing process with minimum cost impact
- ❑ Enable longer driving distance and usage time

Existing Electrode Manufacturing Process



Proposed technology can easily retrofit in the existing process without substantial capital expenditure

- ❑ Patent Cooperation Treaty (PCT) filed in Sep. 2019
- ❑ Two additional patent application planned in near future

Current Status

- ❑ Proposed technology is a part of active on going research program at UW-Milwaukee
- ❑ Seeking collaborative partners for development of the final product
- ❑ Technology is currently available for licensing under exclusive or non-exclusive terms

Applications

- ❑ The proposed technology can be used in Lithium-ion or Sodium-ion batteries
- ❑ Energy storage, electric vehicles (EV), portable electronic devices, sensors and other applications

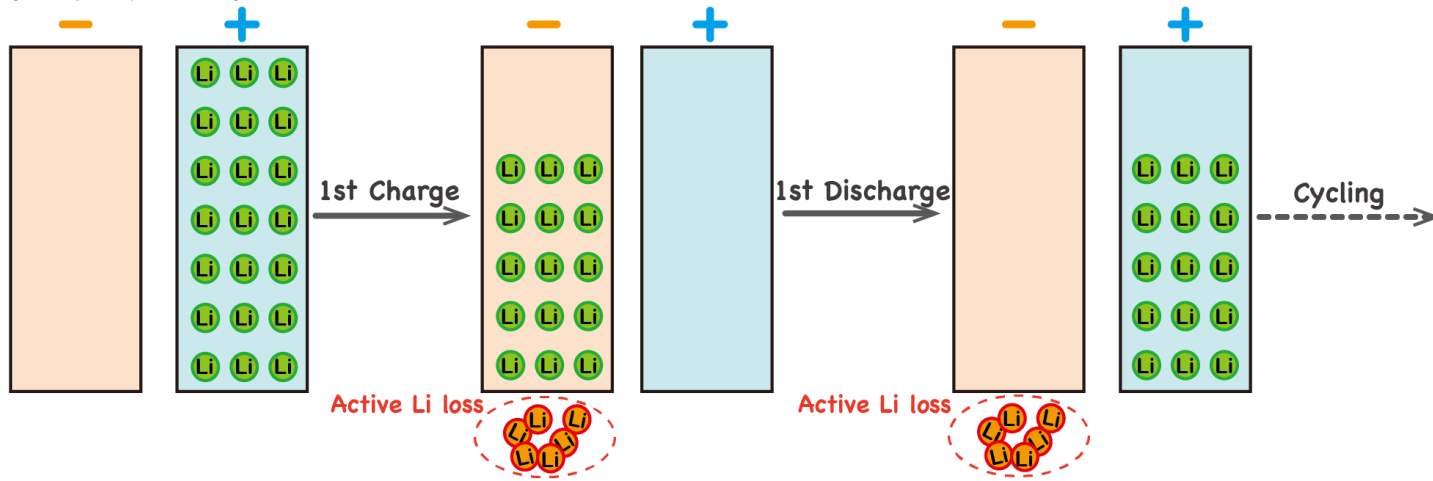
Market

- ❑ Lithium-ion global market is projected to be 14.8 B by 2021 and is growing at CAGR of more than 8% for the period of 2017-2021
- ❑ Sodium-ion battery global market is projected to be 1.2 B by 2022 and is growing at CAGR of 23.9 % for the periods of 2017-2022

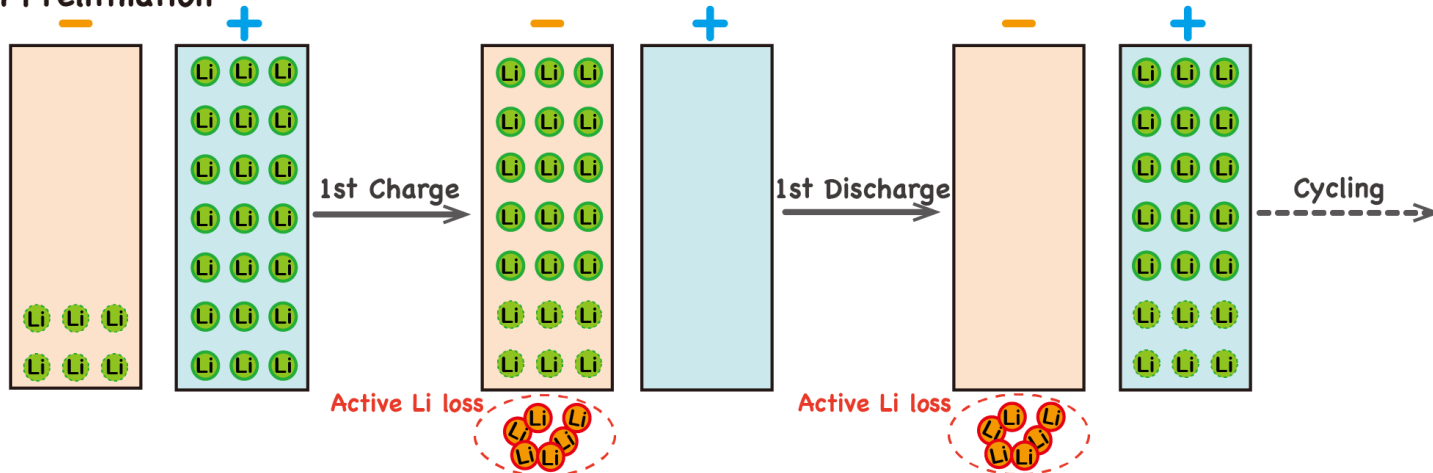
Battery Assembly

Total available energy at the end of formation process:
Traditional battery Vs. Pre-lithiation

Without Prelithiation

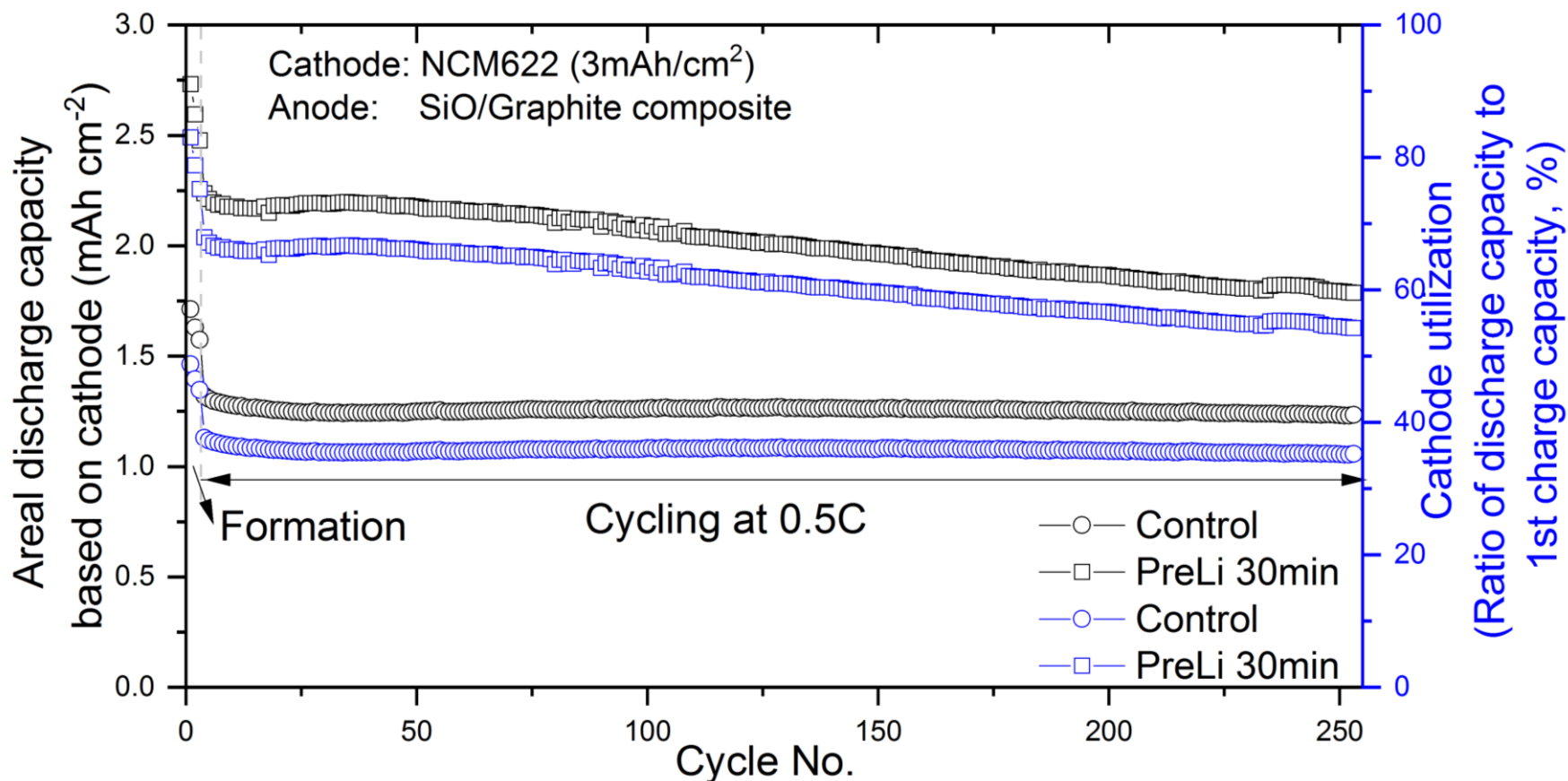


With Prelithiation



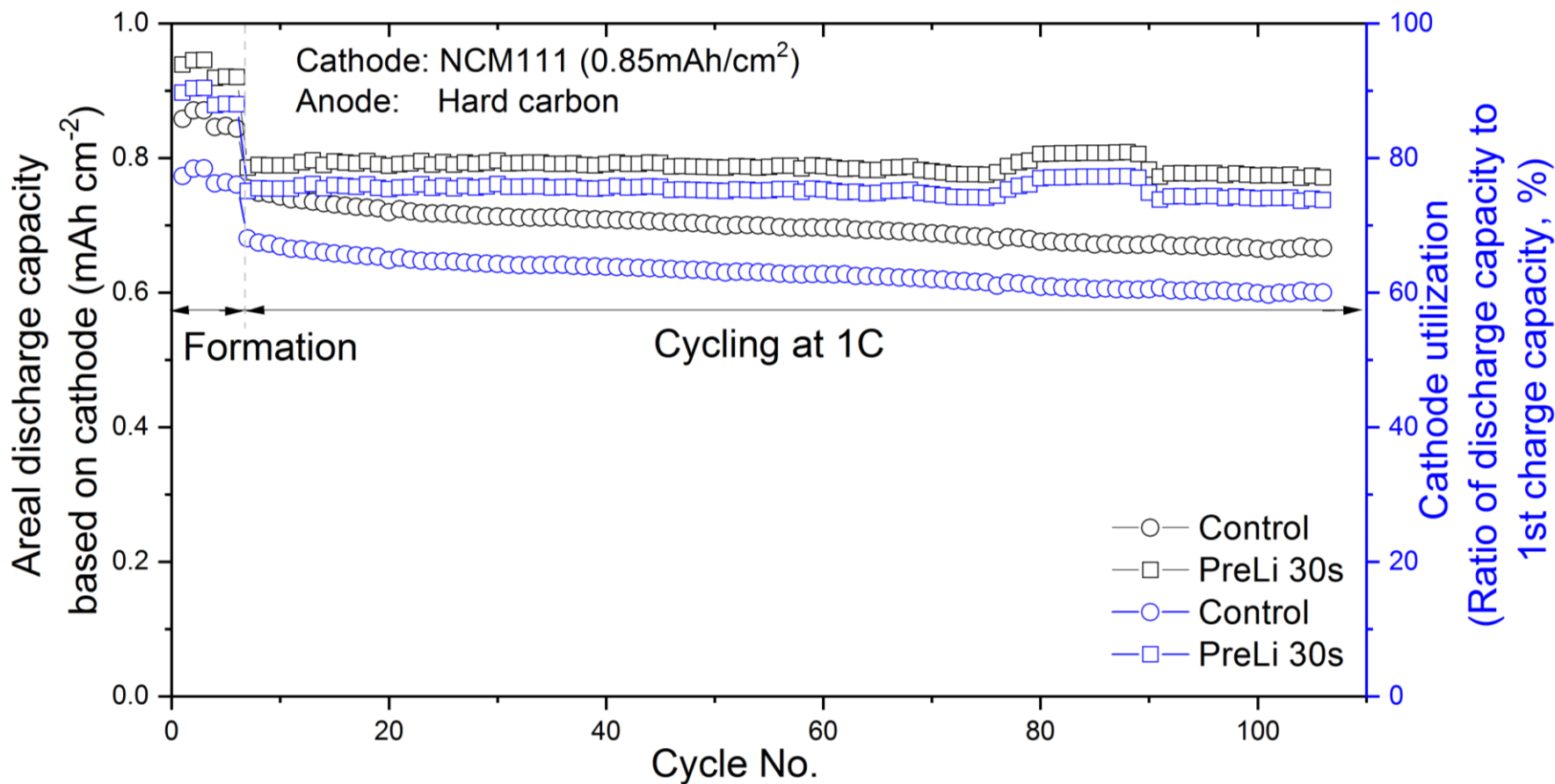
Experimental Data

Full cell cycling performance at 0.5C of a control and a pre-lithiated SiO/Graphite composite anode (using 1 M Li-Bp THF for 30 min)



Experimental Data

Full cell cycling performance at 1C of a control and a pre-lithiated hard carbon anode (using 1 M Li-Bp THF for 30 s)



- Continue to develop final product
- Explore lead anode materials and chemistry
(E.g.: Lithium-Sulfur Chemistry)
- Seeking collaborative partners for
developmental research support
- Seeking potential licensee

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