Transient Self-Discharge after Formation in Lithium-Ion Cells: Impact of State-of-Charge and Anode Overhang

- Investigate the transient self-discharge causing long measurement times in LIB manufacturing during the cell aging (final quality control step).
- Single-layer pouch cells with varying anode overhang.
- Storage test for self-discharge at different States-of-Charge (SOC).
- Main reasons for transient self-discharge:
  1. SEI growth
  2. Anode overhang equalization

Self-discharge after formation

<table>
<thead>
<tr>
<th>SOC</th>
<th>Anode overhang 0%</th>
<th>Anode overhang 8%</th>
<th>Anode overhang 10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOC10</td>
<td><img src="image1.png" alt="Graph" /></td>
<td><img src="image2.png" alt="Graph" /></td>
<td><img src="image3.png" alt="Graph" /></td>
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<tr>
<td>SOC30</td>
<td><img src="image4.png" alt="Graph" /></td>
<td><img src="image5.png" alt="Graph" /></td>
<td><img src="image6.png" alt="Graph" /></td>
</tr>
</tbody>
</table>

Self-discharge during storage

- Low SOC: Very low self-discharge, but still transient behavior → SEI growth
- Low to medium SOC: Anode overhang equalization contributes to self-discharge
- Medium SOC: SEI growth dominates transient self-discharge

Quality control: Self-discharge test