



Design and Validation of a Pneumatic Cell Press to Achieve Uniform Loading for Aging Studies of Li-Ion Pouch Cells

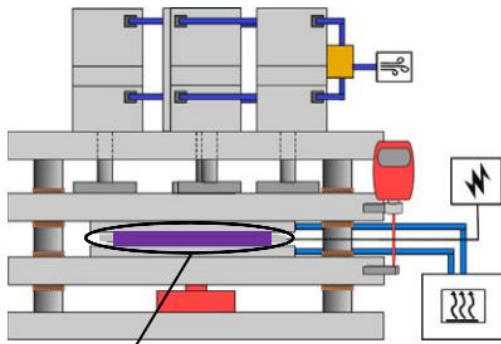
The mechanical stability in lithium-ion battery modules is crucial for the safety and longevity of electric vehicles. As these cells age, they irreversibly grow in thickness, increasing mechanical loads on the module housing. Improper bracing can negatively impact cell lifespan due to the coupled effects of load evolution and cell aging, and yet the interactions of them are complex and not fully understood. Current testing methods for entire modules are expensive and challenging.

Therefore, there is a strong need for cost-effective, single-cell aging tests that accurately replicate the mechanical environment of a battery module. These tests must simulate realistic module stiffness, ensure uniform pressure distribution, maintain controlled cooling temperatures, replicate initial bracing conditions, and accurately record force and cell expansion. Existing setups do not meet all these requirements, highlighting the necessity for a new, highly rigid cell press capable of universal module stiffness simulation with active control loops for in-situ stress measurements.

Tasks:

Build-up a cost-efficiently test stand meeting these requirements:

- Simulates accurately module stiffness
- Ensures highly parallel pressure plates
- Achieves uniform pressure distribution
- Reproduces initial bracing conditions of automotive module assemblies
- Force and expansion recording during testing



What We Offer:

- Acquisition of hands-on experience with advanced experimental setups
- Contribute to impactful research in the field of energy storage
- Collaborative and highly-supportive research environment

Required Skills:

- Strong Hands-on mechanical skills and enthusiasm in constructing mechanical components and tools
- Basic Knowledge of pneumatic systems and components
- Knowledge and/or Experience in pressure control and temperature control (e.g. PID controll...)
- Data Acquisition and Analysis
- Problem-Solving ability
- Independent and self-reliant work style

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