

Developing a Cost-Effective Testing Cell for Solid-State Batteries

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Objective and Research question:

This project aims to create a cost-effective Solid-State Battery (SSB) testing cell by reverse-engineering an existing model, as current cells are expensive, and this approach facilitates mass production and laboratory use.

Background:

- ❑ Current SSB testing cells feature an outer shell made of **high-temperature-resistant plastic**, a **ceramic core** housing the electrical components, and **stainless-steel** presses to apply high pressure and facilitate electrical conduction.
- ❑ SSBs offer **higher energy density, improved safety, and longer lifecycles** compared to liquid-electrolyte Li-ion batteries.
- ❑ Previously worked on conductive polymers for the SSB testing cell, now creating the **overall structure**.

Methodology:

- ❑ Analyzed an existing SSB testing cell and took dimensions.
- ❑ Used SolidWorks CAD software to create a CAD assembly.
- ❑ Analyzed the best method to create the differing parts.

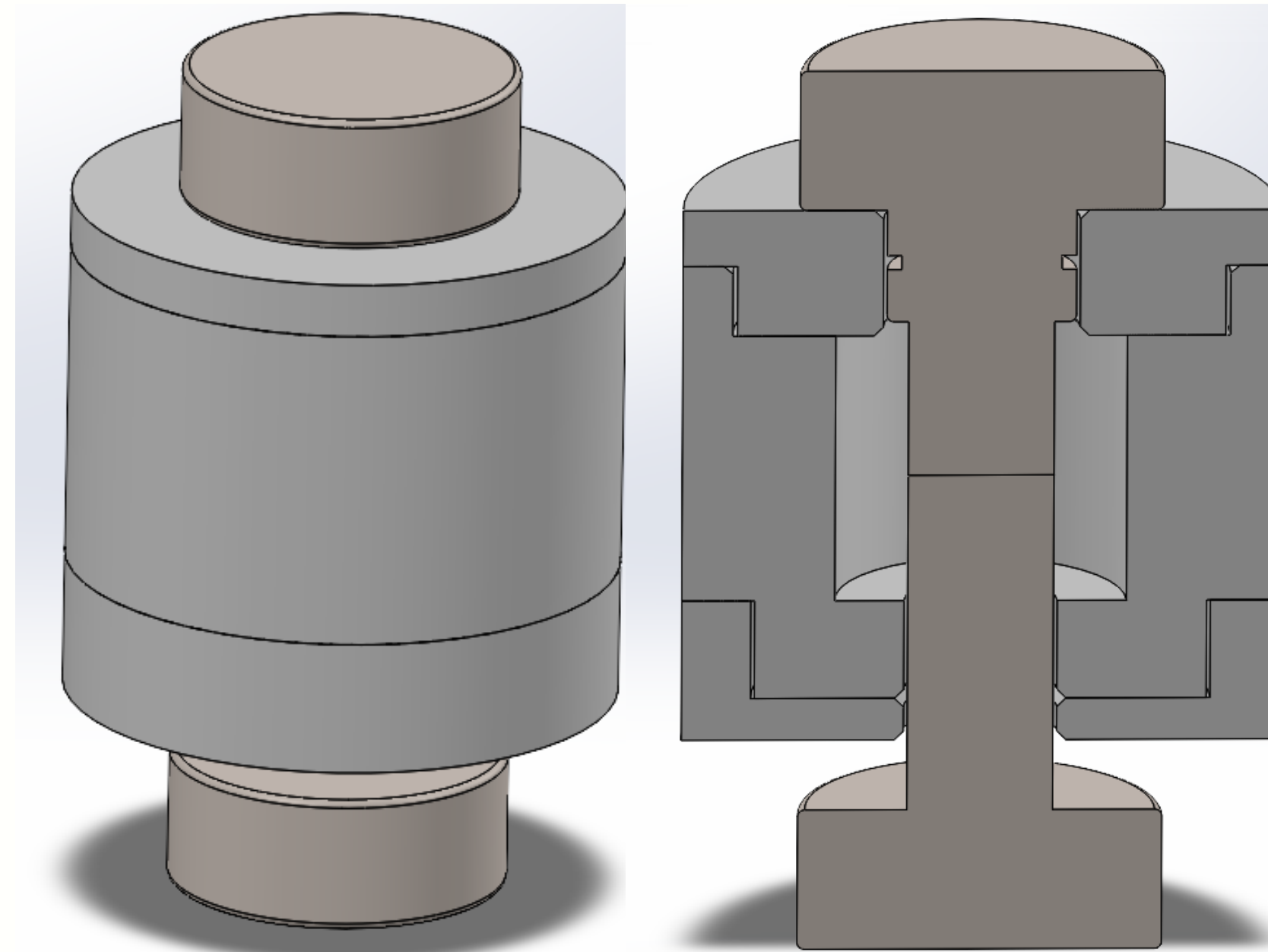


Figure 1: SolidWorks CAD drawing of SSB Testing Cell



Figure 2: 3-D Printed Prototype of SSB Testing Cell

Results:

- ❑ Successfully reverse-engineered an existing SSB testing cell and created a CAD model.
- ❑ 3-D printed prototype of the SSB testing cell.
- ❑ The approximate cost to manufacture each component of the SSB testing cell.
- ❑ Components of the SSB are going through the final stages of manufacturing.

Future Work:

- ❑ Incorporate the optimal polymers determined last semester into this shell.
- ❑ Assemble all electrical components of the SSB testing cell.
- ❑ Measure the voltage output.

Acknowledgements:

Thanks to Professor Xin Xu, Xukun Ma, and Caue Nogueira for their assistance with this project. Thanks to FURI for funding.

References:

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