



Fabrication and testing of aluminum cylindrical batteries

Industrial materials

Background

The battery industry has long relied on nickel-plated steel for cylindrical battery cases due to its proven durability and ability to meet demanding performance standards. However, as the need for lightweight and environmentally friendly materials grow, aluminum alloys have emerged as a potential alternative. Its significantly lighter weight could reduce the overall mass of battery packs, improving the energy efficiency and performance of electric vehicles while lowering the transportation sector's carbon footprint. Advancing aluminum alloy battery cases from concept to market-ready solutions requires addressing several key challenges. Selecting the right aluminum alloy is crucial, as it must possess the appropriate mechanical properties to ensure sufficient sidewall strength, meeting burst pressure requirements and operational demands. Optimizing the tempering process is also important to enhance properties like tensile strength, yield strength, and elongation, ensuring the alloy performs effectively under stress. Comprehensive evaluations, including corrosion resistance must also be conducted to ensure the material's long-term reliability. Real-world testing will help identify potential failure points and refine the design to meet safety and performance standards. These steps are essential to unlocking the potential of aluminum battery cases as an innovative and sustainable solution for electric vehicles.

What we're looking for

We are looking for a partner to fabricate a fully functional cylindrical battery incorporating Novelis' aluminum alloy battery case and perform comprehensive performance testing. Novelis will either provide raw materials for the case, which the partner will fabricate, or deliver a pre-fabricated case ready for battery assembly. The partner must build the battery using the provided case and conduct testing, including cell charge/discharge performance, cell skin temperature measurements, and other critical evaluations to assess performance and durability.

Our must-have requirements are:

- Ability to produce cylindrical battery cells incorporating the provided cases, ideally in 4680 or a similar large format (21700 cells may also be considered)
- Expertise in conducting comprehensive cell performance testing

Our nice-to-have's are:

- Capability to fabricate cylindrical battery cases using aluminum alloy sheets
- Access to facilities for environmental and corrosion resistance testing
- Expertise in recommending design adjustments to improve case durability under real-world conditions

Acceptable technology readiness levels (TRL): Levels 3-6

1. Basic principles observed
2. Concept development
3. Experimental proof of concept
4. Validated in lab conditions
5. Validated in relevant environment
6. Demonstrated in relevant environment
7. Regulatory approval
8. Product in production
9. Product in market

What we can offer you - Eligible partnership models:

Sponsored research
Supply/purchase
Co-development

Benefits:

Sponsored Research

Up to \$70,000 based on evaluation of proposal, with additional potential funding for further development.

Expertise

Partners will have access to industry experts in specific aluminum processes, surface engineering, and material properties. A company champion will be provided to ensure collaborative success.

Tools and Technologies

Partners can be supplied with aluminum substrate for the purpose of testing proposed technology and formed aluminum parts for prototype testing. There is potential for industry-wide commercialization.

Data

Partners will be supplied with information regarding structural modeling of battery enclosures.

Facilities and Services

Partners will have access to our internal testing capabilities and other evaluation equipment located in our research facilities.

Who we are

The Novelis R&D mission is to be the leading provider of sustainable and innovative aluminum solutions. Our team delivers industry-leading technical expertise and innovative solutions via our applied technology labs around the world. Our engineers, scientists, metallurgists, chemists and computer scientists have set the standard for aluminum alloys. Owning more than 134 automotive-specific patents, we are committed to continuing to lead the industry in innovation. We win by shaping partnerships inside the company and around the globe. Because lasting innovation doesn't happen alone. The ability to think big and act bold is at our core. It's how our breakthroughs happen. It's how we brought one of the first all-aluminum vehicle bodies to the automotive industry.

Reviewers

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