CHEMISTRY THAT MATTERS™

BLUEHERO™

CASE STUDY

FORD TRANSIT HIGH-VOLTAGE BATTERY BUSBAR

ADVANCING EV SAFETY & EFFICIENCY

BACKGROUND & CHALLENGE

As the automotive industry transitions to electric vehicles (EVs), manufacturers face increasing pressure to develop lightweight, cost-effective, and high-performance components. A key challenge in EV battery design is ensuring safe, reliable, and thermally stable high-voltage connections. Traditional polyamide (PA) busbars, while widely used, can present tradeoffs in cost, weight, and thermal management, depending on design requirements. To enhance fire safety, reduce weight, and improve cost efficiency in its Transit EV platform, Ford sought an innovative material solution.

INNOVATION & DIFFERENTIATION

This pioneering FR PPc solution challenges the industry belief that only PA materials can be used for high-voltage busbar insulation. Key advantages include:

- **15% weight reduction** compared to PA, potentially contributing to improved vehicle efficiency and range
- **Up to 35% cost savings**, making EV production more economical
- **Improved fire performance**, with intumescent properties that significantly reduce cold-side temperatures during thermal propagation
- **Greater design flexibility**, enabling hinge integration for easier battery assembly

SOLUTION

Ford, in collaboration with SABIC and system supplier Kyungshin, chose a groundbreaking flame-retardant polypropylene compound (FR PPc) for high-voltage busbar insulation.

A first-of-its-kind material, SABIC® FR PPc H1030, developed for this application replaces conventional PA while maintaining high thermal resistance and dimensional stability. The material was engineered to enhance safety and mitigate risk in the event of thermal propagation.

PROCESS & IMPLEMENTATION

The project team executed a rapid development cycle, bringing the solution from concept to implementation in just 10 months:

1. **Market Survey & Material Selection** – Identified fail-safe material candidates suitable for high-Ni battery chemistries
2. **Solution Development** – Engineered an FR PPc compound to meet thermal resistance and safety criteria
3. **Prototype & Testing** – Successfully produced sample parts within four weeks, followed by rigorous flame and thermal propagation testing
4. **Production Acceleration** – Leveraged existing tooling and optimized the injection molding process for mass production

RESULTS & IMPACT

The adoption of SABIC® FR PPc in the busbars of the Ford Transit EV platform delivers significant benefits:

- **Potential for increased EV range** through lighter components
- **Lower estimated manufacturing and operational CO_2 footprint**, contributing to sustainability gains
- **Enhanced battery safety**, improving thermal management and fire resistance
- **Scalability**, with additional Ford EV programs potentially integrating this innovative material

This application solution won the Electric and Autonomous Vehicle Systems category at the 2024 SPE® Automotive Innovation Awards, organized by the SPE Automotive Division. This annual competition honors the “most innovative use of plastics” in automotive components, systems, or vehicles.

WHAT’S NEXT

The success of this project demonstrates a new approach for high-voltage busbar materials, paving the way for broader adoption across future EV platforms. With sustainability, safety, and cost efficiency at the forefront, SABIC continues to push the boundaries of innovation in electric mobility.

CONTACT US

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