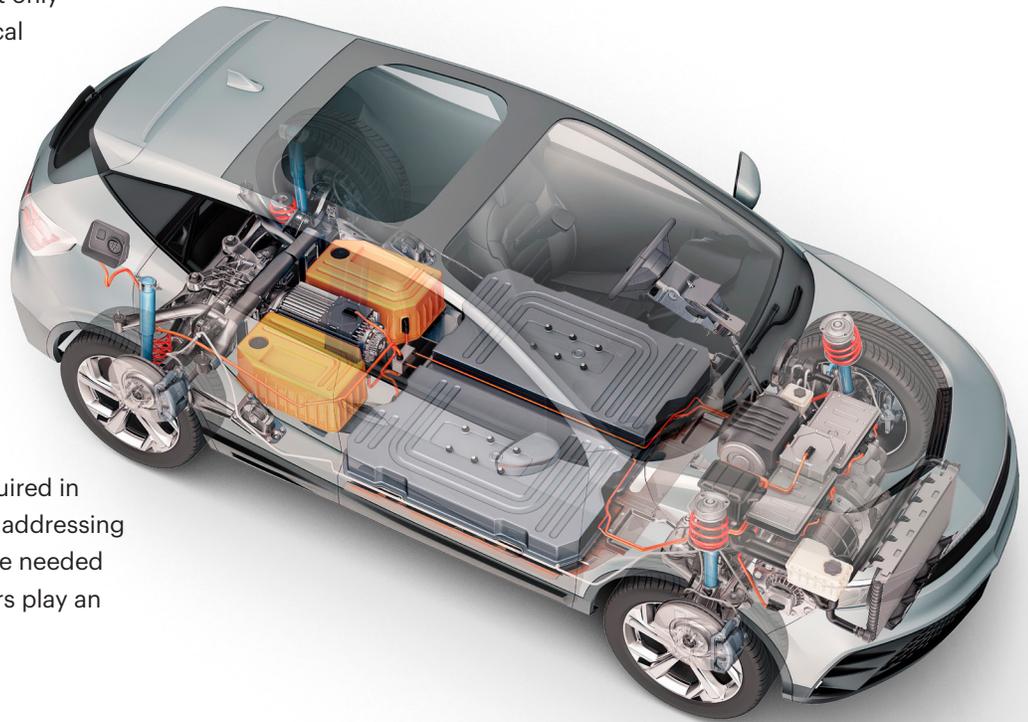


Electric vehicle battery systems

As demand for Electric Vehicles (EV) continues to grow, so does the demand for more robust and efficient batteries. Entire vehicle platforms are being built around the battery, which not only supplies power but also serves as a critical structural element in EVs today.

Both battery manufacturers and automakers are focusing on building lighter, more cost-effective batteries that can operate in a compressed space and charge quickly and safely. As the designs of these battery systems evolve, so do the needs and challenges of each component that make it all possible.

From the high strength and stiffness required in the battery's enclosures and modules to addressing the demanding heat and flame resistance needed across a variety of components, polymers play an important role.



From thermoplastic resins and compounds to thermoset composite solutions, the diverse polymer portfolio from LyondellBasell is uniquely positioned to address your challenges in EV battery systems.

Material solutions for EV battery systems

Battery enclosures

- Premi-SMC
- Hostacom
- Polyflam

Battery modules

- Hostacom
- Hostalen
- Schulamid
- Schulablend
- Dura-BMC

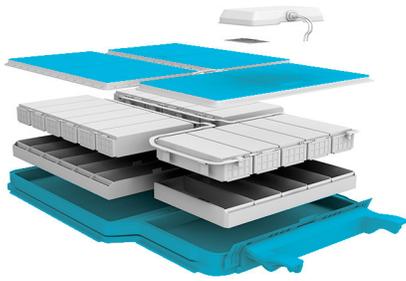
Thermal management

- Schulamid
- Hostacom
- Pro-fax

Electrical systems

- Schulamid
- Schuladur
- Polyflam
- Dura-BMC
- Petrothene

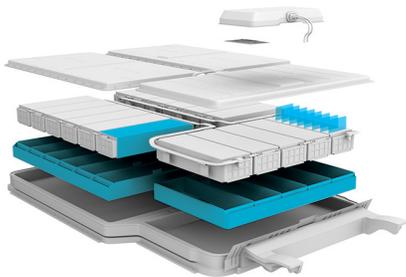
Design selection example



Battery enclosure

- *Premi-SMC & Polyflam*

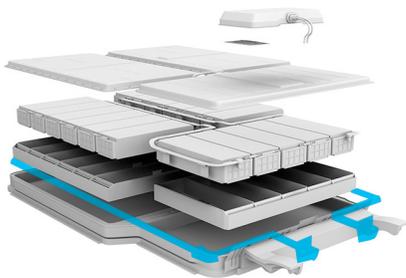
Premi-SMC (Sheet Molding Compounds) are a lighter-weight alternative to traditional metals used in EV battery trays and covers. The high strength and stiffness of these lightweight composites offer flexibility for complex 3D designs that can meet structural, heat and flame requirements. When compression molded, cost efficiencies can be achieved when factoring in the life and output of a vehicle program. *Polyflam* and *Hostacom* polypropylene (PP) compounds can be considered for injection molding of higher volume components.



Battery modules

- *Hostacom*

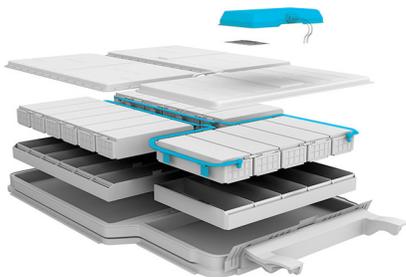
Hostacom PP compounds can be tailored for high rigidity, excellent impact strength, superior dimensional stability, and high flow for thin wall housing and frame designs. *Hostalen* unfilled PP grades have also been used in module dividers and heat exchanger parts. For components requiring higher strength and stiffness at elevated temperatures, *Schulamid* (PA) and *Schulablend* (PC/ABS) products may be considered.



Thermal management

- *Schulamid & Hostacom*

Lower operating temperatures and pressures within EVs allow lighter weight cooling tubes extruded with *Schulamid* polyamide (outer layer) and *Hostacom* PP compounds and *Pro-fax* PP (inner layer) to meet requirements with lower cost. For tube connectors and manifolds, glass-reinforced injection molding grades can meet specifications for mechanical burst strength, resistance to abrasion, creep, and coolant fluids, along with matching coefficient of thermal expansion (CTE) for high quality assemblies.



Electrical systems

- *Schulamid & Dura-BMC*

From housings and connectors to wire insulation, the EV electrical network has a set of demanding requirements. *Schulamid* grades can achieve UL ratings for flame, address thermal aging (RTI), and electrical performance. For extreme heat and flame areas, such as terminal blocks, *Dura-BMC* composites offer integrity to protect sensitive electronics. For wire harnesses, *Petrothene* polyolefin meets industry regulations for high voltage wire & cable insulation.

Before using a product sold by a company of the LyondellBasell family of companies ("LyondellBasell"), users should make their own independent determination that the product is suitable for the intended use and can be used safely and legally. LyondellBasell MAKES NO WARRANTY, EXPRESS OR IMPLIED (INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE) OTHER THAN AS AGREED TO BY LyondellBasell IN THE PRODUCT SALE CONTRACT. LyondellBasell prohibits or restricts the use of its products in certain applications.

For further information on restrictions or prohibitions of use, please contact a LyondellBasell representative. Users should review the applicable Safety Data Sheet before handling the product. *Premi-SMC*, *Hostacom*, *Hostalen*, *Schulamid*, *Schulablend*, *Schuladur*, *Dura-BMC*, *Pro-fax*, *Polyflam* and *Petrothene* are trademarks owned or used by one of the LyondellBasell family of companies and is registered in the U.S. Patent and Trademark Office.