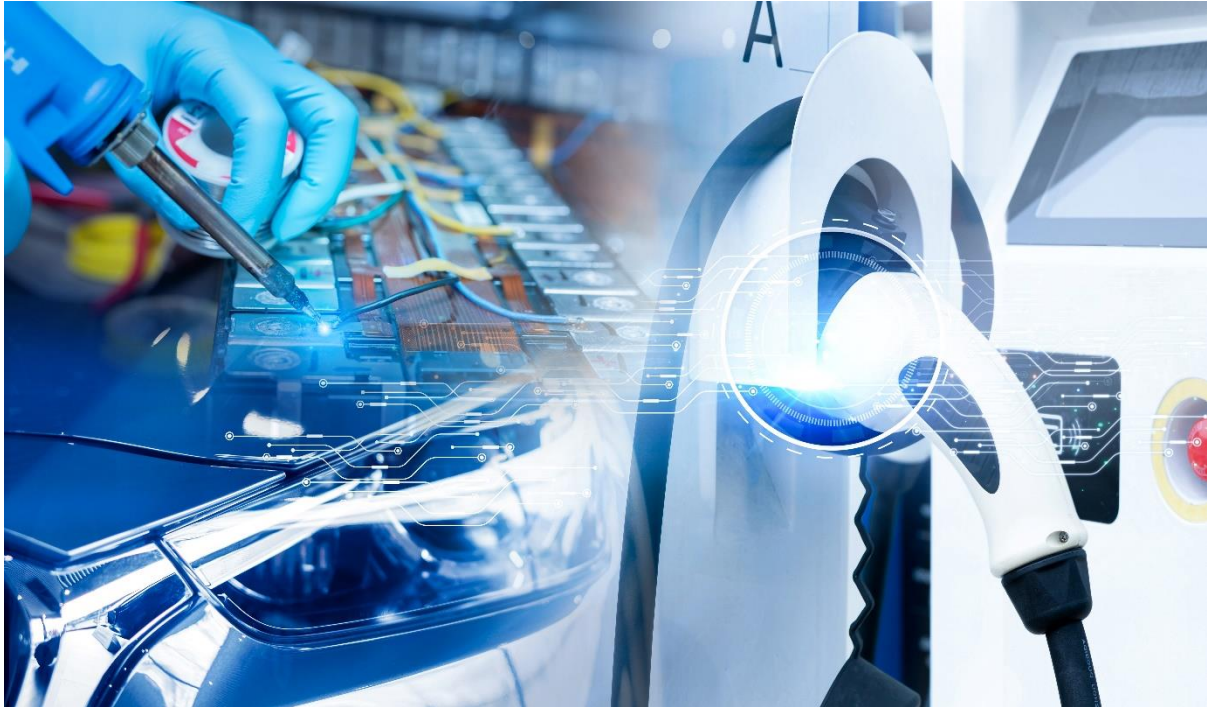


## Sustainable Tape Solutions for the EV Batteries Market

As enablers of a sustainable future, adhesive tapes play an important role in supporting downstream sectors in their journey towards sustainability. Key sectors such as packaging, construction, and transportation, amongst others, are adopting innovative solutions to counter global energy and climate challenges. In the case of the automotive sector, electric vehicles (EVs) are gaining prominence as a sustainable solution and the market for EV batteries is growing.



However, there are certain pain points and challenges that EV batteries need to overcome to support the transition to e-mobility. Adhesive tapes can not only provide structural integrity and lightweighting solutions, but can also play a crucial role in electrical and thermal management.

### What's driving the transition to e-mobility?

The transition from Internal Combustion Engine (ICE) cars to Electric Vehicles (EVs) is propelled by a convergence of factors with many governments offering incentives including tax credits, rebates, etc. This shift is considered to be a pivotal step toward a more sustainable future as EVs offer benefits like reduced dependence on fossil resources, lower greenhouse gas emissions, energy efficiency, etc.

While EV technology is rapidly evolving and we are witnessing more innovations in battery chemistry, further improvements are necessary. This is especially true with respect to supporting infrastructure, end-of-life recycling of batteries, and overall safety.

### How do adhesive tapes support the needs of EV batteries manufacturers

Adhesive tapes provide multifunctional support i.e. they improve the efficiency of production lines, increase safety and decrease the overall weight.

Just like the case of internal combustion engine (ICE) cars, the use of adhesive tapes as a replacement for mechanical fasteners **drives down the overall weight** of EVs. This is essential to

extend the driving range of EVs, which is analogous to improving fuel efficiency in the case of ICE cars.

Lightweighting	Structural integrity
Thermal runaway protection	Electrical insulation

**Table 1.** Benefits of using adhesive tapes in EV batteries

But, lightweighting is only one of the many benefits of using adhesive tapes. Their use enables **reliable assembly** of cell packs and modules. Also, as the demand for more compact and high-performance EV batteries grows, tapes also play a key role in ensuring optimal thermal and electrical management for overall safety.

#### Thermal runaway protection in EV batteries with specialised adhesive tapes

During the charge and discharge process, cells generate some heat, which normally gets dissipated under ideal conditions. However, if the cell gets overheated, it can catch fire and spread across the battery pack owing to the *domino effect*. This phenomenon is referred to as “thermal runaway”.

The cell reaches thermal runaway when its temperature rises uncontrollably at a rate greater than 20° centigrade per minute with maximum temperatures reaching greater than 300°C accompanied by gas and/or electrolyte venting, smoke or fire or a combination of all.<sup>1</sup>

Clearly **thermal runaway protection** is an important requirement for battery manufacturers. The use of adhesive tapes can provide the required protection. This is achieved with the use of **flame-retardant tapes** between the cells. Specialised tapes can also help with the dissipation of heat, which improves the cooling of the batteries. Similarly, the risk of short circuits is also countered with the use of innovative tapes that provide adequate EMI shielding and electrical insulation. In some cases, functional safety materials such as ceramic fibre blankets, aerogels, etc. are placed over the battery cells and kept in place with the use of adhesive tapes.

#### Multifunctional tapes for EV batteries: Commercial examples

Several tape manufacturers have developed comprehensive tape solutions to meet the requirements of EV battery manufacturers. Some of the commercially available examples are listed in the table below.

Tape Manufacturer	Specialised Tape Solutions for EV batteries
<a href="#">Avery Dennison</a>	<p><b>EV Battery bonding tapes</b> are transfer tapes and double-coated tapes designed to bond two materials together within an EV Battery application. These tapes offer varying degrees of flame retardance, extra-low-surface bonding ability, gap-filling and dielectric strength.</p> <p><b>EV Battery protection tapes</b> are single-coated tapes designed to protect a single substrate with a filmic facestock when applied to an EV Battery application. These tapes provide dielectric strength and dimensional stability, with some adhesive options offering flame retardance.</p>

<a href="#">Coroplast Tape</a>	<p><b>High-performance tapes</b> are suitable for a wide range of applications in battery construction. They feature homogeneous, continuous tack and extremely flexible acrylic adhesive compounds.</p> <p><b>Sliding adhesive tapes</b> are the ideal gap-filling and spacer solution for battery construction. Ultra-high molecular weight polyethylene (UHMW-PE) provides this combination of impressive robustness and excellent processability.</p>
<a href="#">Lohmann GmbH &amp; Co.KG</a>	<p><b>Thermally conductive acrylic transfer tapes</b> that meet UL 94 flame retardant requirements and allow efficient connections to be made to the cooling or heating element of the battery.</p> <p><b>Electrically conductive transfer tapes</b> or metallised fabric or foam backing with acrylic adhesive on one or both sides offer excellent EMI shielding properties in a wide frequency range (450 MHz - 3.8 GHz).</p> <p><b>Electrically insulating film tapes</b> for applications where high heat resistance combined with electrical insulation is required.</p>
<a href="#">Saint-Gobain Tape Solutions</a>	<p><b>Multi-functional foam tape</b> (fire-blocking polyurethane foam) is ideal for use as a battery pack seal. Silicone foams are also available for pack sealing, catering to battery packs with different needs/demands.</p> <p><b>Mica tape for thermal insulation</b> has excellent mechanical, electrical and flame mitigating properties. It also offers excellent dielectric strength and is a premium solution for thermal runaway protection.</p>
<a href="#">tesa</a>	<p>Two major application areas in focus are <b>permanent bonding</b> of battery cells and <b>insulation of electronic components</b>. The R&amp;D team is working on developing thermally conductive tapes and fire-resistant adhesive tapes.</p>

**Table 2.** Multifunctional tapes for EV batteries: Key players in the market

## Conclusion

The rapid growth of the automobile industry, and e-mobility in particular, will drive the growth of specialised multifunctional tapes. To cater to the specific needs of EVs, manufacturers of automotive adhesive tapes continue to work on developing new variations to support this sustainability trend.

## References:

<sup>1</sup> [What Is Thermal Runaway? | UL Research Institutes](#)