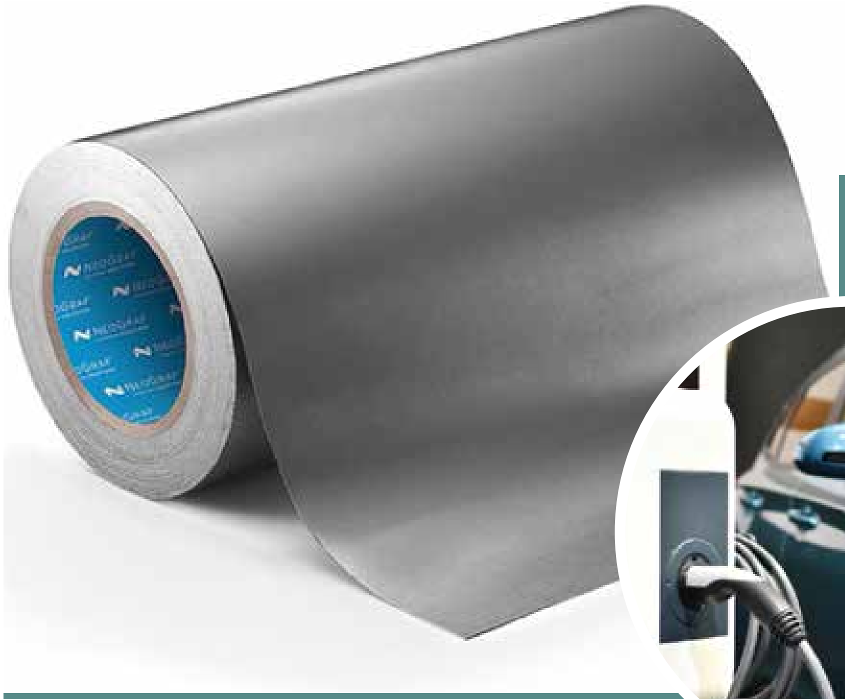
Lightweight EV battery solution

Graphite's material properties provide the key to unlocking lightweight, long-life, and safe EV battery packs

Driving range is considered by consumers as one of the biggest factors when purchasing any particular EV. For an electric vehicle to offer the greatest range achievable from its battery, it needs to be as efficient as possible. Reducing weight is vital to delivering this, which is why EV manufacturers are moving to graphite battery heat fins for weight reduction. The innovative solution can help shed up to 40kg per vehicle, providing a stepwise increase in range.

NeoGraf Solutions, which specializes in graphite heat spreaders, is rolling out a line of flexible graphite cooling fins to the electric vehicle market. Its SpreaderShield heat spreaders are designed to replace traditional aluminum cooling fins typically found between the pouch or prismatic cells of an EV battery module. By replacing the thick and heavy aluminum as the primary cell thermal management material with graphite, OEMs can reduce between 20 to 40kg (44 to 88 lbs) of weight per vehicle.



NeoGraf Solutions' flexible graphite replaces aluminum for battery cooling fins to deliver greater thermal performance as well as weighing less to help improve vehicle efficiency

SpreadShield graphite heat spreader provides thermal runaway protection for safer and faster charging batteries

Graphite's thermal performance is greater than aluminum, while also having the benefits of measuring half the thickness and a third of the weight. Therefore, NeoGraf's SpreaderShield graphite heat spreaders have replaced aluminum as the standard heat spreader in high-end consumer electronics.

Its primary benefit is the lightweight material reduces the need to spend as much energy carrying an overly heavy battery pack. Meanwhile, a secondary benefit is a reduction in the size of the individual battery modules. Graphite cooling fins are half the thickness of a traditional aluminum fin. This results in the length of each module shrinking by anywhere from 12 to 20mm (0.47 to 0.79in), allowing the pack size to shrink while still maintaining the same amount of energy. As this smaller pack weighs less, it contributes to increased driving range.

As the need for battery safety becomes more critical, graphite also provides protection in two important ways. Firstly, it has an extended escape time. Adding a graphite heat spreader between the modules and the pack housing spreads out the heat of a thermal runaway event. This allows the pack housing to maintain its integrity and lowers the average pack hot-spot temperature, allowing the pack to achieve its escape time requirements.

Secondly, it has cell-to-cell propagation control. This means that if a cell fails, graphite channels the heat down to the cold plate and allows the failed cell to return to thermal equilibrium without causing neighboring cells to also fail.

Designing with graphite becomes a simple drop-in to an existing aluminum heat fin design. The only difference is that the graphite is thinner, so the plastic cell carrier can also be reduced in size.

Graphite parts are laminated on both sides with a thin but tough polyethylene terephthalate (PET) plastic laminate. This adds a high level of dielectric protection and adds robustness to the graphite part. The parts are also coated on one side with a thin and effective adhesive. This allows the graphite to be used as a simple peel-and-stick part.

Graphite's ability to make EV battery packs smaller and lighter, unlock greater driving range, provide faster charging, longer cell life, and even thermal runaway protection, this material is the future of battery cooling.

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