

Related information on battery system lightweighting

How will the lightweighting strategy change as battery technology improves?

The objective of this analysis is to understand how the lightweighting strategy will change as battery technology improves and industry learning enables more efficient manufacturing processes. This model enables the evaluation of these tradeoffs of material substitution over time.

Do battery pack systems improve crashworthiness and lightweight design in electric vehicles?

The research focuses on optimizing battery pack systems (BPSs) for crashworthiness and lightweight design in electric vehicles. Traditional methods have high computing costs and do not account for the battery cell's failure criterion. This study uses a submodel and hybrid weighting for multi-objective design.

What is lightweighting and how does it work?

One approach to partly address these issues is lightweighting, which involves reducing the weight of vehicles to minimize their impact during the use phase. Mathematical models are employed to simulate the longitudinal dynamics of vehicles and estimate the energy required to accomplish driving missions.

What is a vehicle lightweighting database?

Such a database would be useful in evaluating the effectiveness of vehicle lightweighting and its impact on energy consumption and pollutant emissions. The last phase of the analysis is the assessment of the overall reduction in the environmental impact of the vehicle throughout its life cycle by using the LCA (Life Cycle Assessment) approach.

Why do EVs use lightweight materials?

This trade-off has made cost efficient vehicle lightweighting a top priority of EV design, and many automakers have implemented aggressive changes to use lightweight materials. For instance, Tesla's Model S and Model X are aluminum intensive to increase vehicle performance.

Does lightweighting affect vehicle dynamics?

In the scientific literature reviewed, there are no studies of the effects of lightweighting on vehicle dynamics. This aspect holds considerable importance as it directly affects stability, handling, road holding and braking distances, which are vital for active safety, a fundamental aspect that is a priority in the design phase of a vehicle.

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In this paper, a methodology is outlined to study the tradeoff between the battery cost savings achieved by

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vehicle mass reduction for a constant electric driving range and the ...

A data-driven model (DDM) of Li-ion batteries (LIBs) using the enhanced single-particle model with electrolyte as the plant dynamics and a sparse model of the system was ...

In this paper we focus on the battery pack lightweighting by considering different passive battery cooling systems as a replacement for the standard active one. The passive systems considered are air and PCM-based (Phase Change Material) cooling systems. ... and an ad-hoc battery system model, configurable according to the cooling system ...

Current electric vehicle research hotspots include electric vehicle motor drive system [9,10], electric vehicle charging technology [11,12], charging harmonic analysis [13,14], and charging ...

High-performance battery specialist Bold Valuable Technology (Barcelona, Spain) has developed a high-voltage battery system called BOLDair catered to the needs of electric and hybrid aircraft. As CW contributing writer Stewart Mitchell reports, the BOLDair battery weighs only 52 kilograms and offers a specific energy of 285 watt-hours per ...

The average weight of a lithium-ion battery is 400-600kg, and with range according to charge very much tied in with weight, designers and material suppliers are looking at new ways to lighten the vehicle structures, ...

EVs are significantly heavier than gasoline-powered vehicles, primarily because of their lithium-ion (Li-ion) battery traction packs. For example, the GMC Hummer EV SUV (Figure 1) battery pack weighs roughly the same ...

Improvements in electric vehicle battery technology influence vehicle lightweighting and material substitution decisions: Publication Type: Journal Article: Year of Publication: 2020: Authors: Burd JTJ, Moore EA, Ezzat H, Kirchain R, Roth R: Journal: Applied Energy: Start Page: 116269: Date Published: 12/2020: URL

Kautex's new battery enclosures made from thermoplastic composite or a composite-metal hybrid helps OEMs tackle this "weighty" topic. Our solutions offer up to a ...

There are different lightweighting methods, which are divided into primary and secondary lightweighting. Regarding the primary, several studies are referred to the strategy of material substitution and mass reduction [7], [12], in particular [7] considers different alloy and technologies of components manufacturing, [13] studies the use of plastic materials to obtain ...

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