



What are the types of battery pack disassembly methods

The battery pack's wiring network will vary based on the manufacturer. This step of the battery disassembly requires trained human resources and would be particularly difficult to automate through robots [97]. Further, wire degradation may vary, complicating the deployment of artificial intelligence or machine learning techniques [22, ...

The battery packs on the current battery market have different structures and assembly methods of the battery modules from the battery packs, including battery types and battery chemical properties . The diversity of EV batteries makes it a major challenge to disassemble them into battery modules or cells.

The design solutions are assessed from an assembly, disassembly and modularity point of view to establish what solutions are of interest. Based on the evaluation, an "ideal" ...

This paper analyses the use of robotics for EVs" battery pack disassembly to enable the extraction of the battery modules preserving their integrity for further reuse or recycling.

The heat produced by the li-ion cell occurs through both Joule heating effects and reversible heat generation effects at the solid and electrolyte phases when charge is transported [6].The rate of charging and discharging of the li-ion Battery Cell relative to its nominal capacity also has an effect on the heat generated by the battery ...

A large number of battery pack returns from electric vehicles (EV) is expected for the next years, which requires economically efficient disassembly capacities. This cannot be met through purely ...

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With the surging interest in electric vehicles (EVs), there is a need for advancements in the development and dismantling of lithium-ion batteries (LIBs), which are highly important for the circular economy. This ...

Disassembly is a pivotal technology to enable the circularity of electric vehicle batteries through the application of circular economy strategies to extend the life cycle of battery components through solutions such as remanufacturing, repurposing, and efficient recycling, ultimately reintegrating gained materials into the production of new ...

4) Difficulties for robotic disassembly. An EV-LIB pack comprises multiple modules with numerous cells connected in various configurations with different mechanical, electrical, and chemical joining techniques. In addition, there are also different functional systems in a pack, e.g., battery management system (BMS) and thermal management ...



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The total disassembly cost for per kg of battery pack is calculated as follows: Total cost (\$/kg battery pack) (=) direct labor cost (+) depreciation cost (+) variable overhead cost (+) GSA cost. The total revenue generated by the recycler is the sum of revenue generated by selling materials from pack disassembly and module ...

EV battery disassembly into modules or cells also corresponds to two types of echelon utilization: module-level utilization and cell-level utilization. Due to the uncer-

A major challenge in EOL EVB disassembly is the large variety of battery pack architectures (Chen et al., 2019; Diekmann et al., 2017; Harper et al., 2019; Meng et al., ...

To facilitate construction analysis, failure analysis, and research in lithium-ion battery technology, a high quality methodology for battery disassembly is needed. This paper presents a methodology for battery disassembly that considers key factors based on the nature and purpose of post-disassembly analysis. The ...

However, with more extended objectives, constraints and different methods of disassembly, inconsistent models relating to product representations and types of disassembly lines have become the ...

A battery pack is a hierarchical and repetitive assembly of individual cells. The challenges in battery pack assembly process are: a) Different Battery Cell Types: Due to different cell size, shape, form factor, and capacity the assembly process needs to be setup for each type of battery cell type. This adds to the

Despite the importance of battery pack disassembly in the recovery of battery materials, information on pack disassembly processes and associated costs are still scarce in the current literature.

This paper aims to contribute to designing adaptive disassembly planners for battery systems by combining the autonomous disassembly planner presented by Choux et al. with a disassembly strategy optimizer, which will be implemented and tested using an Audi A3 Sportback e-tron hybrid battery pack. The battery, instructions about ...

Finally, the effectiveness of the method is tested with a case study of a power lithium-ion battery pack. The case study has indicated that this presented method can generate the disassembly task schemes quickly and effectively, when applied to the disassembly of large-scale heterogeneous automobile power batteries.

The disassembly methods of EVBs differ from the disassembly of other types of LiBs, e.g. consumer electronics LiBs such as laptops, smartphones, and tablets. ...

In the specific context of lithium-ion battery (LIB) pack disassembly, research has demonstrated that human-robot collaboration is the most effective ...



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3.1 Test setup. The setup for the automated and flexible disassembly process as well as the different Cartesian Coordinate Systems (CCS) is shown in Fig. 3. The system uses a 6-axis articulated arm robot (Comau NJ290 (-) 3.0) with a milling spindle and a structured-light 3D scanner system (Zivid Two). A flexible clamping system which is ...

Wu et al.'s literature review shows that research in the field of manual and automated battery pack disassembly has increased, particularly since 2018. Studies on automation have predominantly focused on conceptual disassembly down to different levels, but this has mostly been limited to abstract representations of layout concepts.

EV-LIB disassembly is recognized as a critical bottleneck for mass-scale recycling. Automated disassembly of EV-LIBs is extremely challenging due to the large ...

Due to the absence of standardized specifications and configurations for retired battery packs and modules, the disassembly of battery equipment often relies on manual involvement with human operators playing a key role in the process. 32 Typically, at least two individuals are required for this process. 26 Given the high voltage associated ...

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With the surging interest in electric vehicles (EVs), there is a need for advancements in the development and dismantling of lithium-ion batteries (LIBs), which are highly important for the circular economy. This paper introduces an intelligent hybrid task planner designed for multi-robot disassembly and demonstrates its application to an EV ...

A battery disassembly time comparison between manual and automatic disassembly of a small single module battery is proposed in a study by Zhou et al. [28], which highlights the large percentage of ...

With the increasing use of batteries, battery recycling would become a considerable problem in the next decade. However, the current recycling technologies are still on the stage of research and development. A significant challenge in the traditional recycling method is that the recovery procedure relies heavily on manual work. ...

(DOI: 10.1115/1.4062235) With the wide application of new electric vehicle (EV) battery in various industrial fields, it is important to establish a systematic intelligent battery recycling system that can be used to find out the resource wastes and environmental impacts for the retired EV battery. By combining the disassembly and ...



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