What are the patents for battery management technology

The European Patent Office granted European Patent No. EP 3 596 774 B1 for Beam Global"s smart battery management system (BMS) that monitors thermal storage capacity of Beam Global"s proprietary phase change composite (PCC TM) material and automatically adjusts the power output of the battery packs and cells as a function of the PCC(TM) thermal ...

Battery technology developers are obtaining patents for innovations across all parts of the cell and battery to maximise their commercial positions. Continued growth in ...

Grant share is based on the ratio of number of grants to total number of patents. Battery with thermal management component for temperature adjustment. Source: United States Patent and Trademark Office (USPTO). Credit: Contemporary Amperex Technology Ltd. A recently granted patent (Publication Number: US11888136B2) discloses a novel battery ...

BMS technology . The battery management system (BMS) ... Battery safety. Our patents enhance flexibility, thermal propagation control and impact resistance to give end users the highest levels of battery safety. Battery software. Advances in software for communication, modularity and intelligence makes our battery systems smarter and more ...

Herein, battery patents are categorized into cell, module and pack levels, and are recorded with a function of timeline and technology life cycle to identify their development status. It indicates the maturity stage of the cell level while noting the growth stage of module and pack levels, which probably results from the intensive demand of large-size and high-quality ...

By assigning battery technology sub-areas to patent families a decomposition of the dataset into 19 battery cell technologies was obtained (detailed description in the Appendix A.2). Fig. 5 presents the developments of IPF counts in the eight major technological categories, selected on the basis of their total IPF count in the entire time frame of 2000-2019.

A battery management system 404 may be provided for the battery assembly 402. The battery management system 404 may be electrically connected to each battery cell of the battery assembly 402 such that the discharge of each battery cell may be controlled independently. In alternative embodiments, the discharge of each cell may be linked, such ...

Based on these IPCs, the ownership structure of the patents was established through assignee analysis., Analyzing the networks obtained at different IPC levels, we found that multiple technologies have converged in a BEV, from battery chemistry to electrical engineering and thermal management of electrical machines.,

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The outcome of this work has led to the ...

Consequently, though having a large number of patents as a forerunner of the field, Toyota granted royalty-free licenses 6 of its EV and fuel cell related technology patents, 23,740 in total, in ...

A method and apparatus are disclosed for a Battery Management System (BMS) for the controlling of the charging and discharging of a plurality of batteries (12). Each battery has an associated plurality of control circuits (32, 36) which monitor and control the charging of individual battery. These units are controlled by a central microcontroller (14) ...

We prepared patent applications for battery safety systems, charging and discharging algorithms, and controlling the drawing of energy from hybrid power systems.

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