Battery processing patent technology research direction

Why do we need a patent for battery technology?
The amount of the application of a certain patent represents the degree of social concern for the battery technology to some extent. It can be found that the R&D activities of the battery technology in current are mainly concentrated in three areas: fuel batteries, lead-acid batteries, lithium ion batteries.

Why is patent analysis important for EV battery design?
Patent analysis is a powerful means to inform technology life cycle and forecast upcoming innovations. To date,only a handful of research have quantitatively analysed and compared battery assembly in the EV field,resulting in a lack of information to discern the battery layout.

How to find patents for lithium ion batteries?
Because the term 'lithium-ion batteries' was not recorded until the commercialization of Li-ion batteries by Sony, we combined the formula of TS = (cell% OR secondary batter* OR batter* OR accumulator OR rechargeable batter*), IPC code and keywords to search for patents, and then manually added these patents in corresponding battery levels.

What is patent inventor in EV battery technology?
Analysis of R&D cooperation in EV battery technology Patent inventor refers to the specific application of the patent. The applicant and the inventor of patent can be one or more,thus there is such a situation which the applicants or the inventors are in common.

What are the R&D activities of battery technology in current?
It can be found that the R&D activities of the battery technology in current are mainly concentrated in three areas: fuel batteries,lead-acid batteries,lithium ion batteries. Qianqian Zhang et al. /Energy Procedia 105 (2017) 4274 âEUR" 4280 4277 Fig.3.

Are EV battery development conditions based on R&D trend analysis?
But its analysis mainly aimed at the EV specific technical areas, which is lacking of the overall understanding and R&D trend analysis. Therefore, based on the relevant data collected from the patent of EV battery, this paper tries to build a systematic analysis of the development condition and trend of battery technology.

In an ambitious patent study of three energy-related technologies, li-ion batteries, hydrogen production and thermochemical conversion of biomass, the five largest countries in terms of patenting activity were covered . Relevant patents were extracted using a combination of patent classes and keyword search from the European Patent Office"s ...

Based on the data of the patent application on the EVs battery technology, this paper intends to analyze from

the overall trend of the patent, distribution of the patent type,...

Comprehensive, in-depth and accurate analyses of patent technology topic evolutions become increasingly significant since the analytical results can offer related personnel the scientific support to explore or trace back to the origin and the development of the technology. However, existing methods of topic evolutions do not facilitate better understanding of how a ...

This study provides a comprehensive analysis of global patent trends in battery recycling, focusing on secondary batteries and related technologies across Korea, China, and the United...

Figure 5 presents critical timing metrics for the patent process in SSB technologies, ... The insights gathered from patent data analysis not only reflect the direction of ongoing research but also offer critical guidance for industry stakeholders aiming to commercialize SSB technologies. By focusing on the emerging trends identified in this study, manufacturers ...

Analysis of R& D cooperation in EV battery technology Patent inventor refers to the specific application of the patent. The applicant and the inventor of patent can be one or more, thus there is such a situation which the applicants or the inventors are in common. Two indicators can be used to analyse the cooperation situation of the applicant or inventor, one is the ...

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Recently, extensive study has been dedicated on the manufacturing of EVs and their power batteries to comprehensively address these advantages. This research analyzes 12,202 scientific patents from 1970 to 2021, evaluating eco-friendly materials for ...

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We propose the significance of patent claims in the technological trajectory of lithium battery manufacturing (LBM-Tra) research. And we construct a more robust attention mechanism of claim type and claim dependency (T& D-Mechanism).

The research results show that the evolution direction of electric vehicle battery technology gradually converges, and fuel cell technology is the most critical technology in the whole...

Solid-state lithium batteries exhibit high-energy density and exceptional safety performance, thereby enabling an extended driving range for electric vehicles in the future. Solid-state electrolytes (SSEs) are the key

materials in solid-state batteries that guarantee the safety performance of the battery. This review assesses the research progress on solid-state ...

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Abstract: The technological trajectory of lithium battery manufacturing (LBM-Tra) provides valuable insights for managers and policymakers. However, current methods face difficulties in comprehensively understanding the diverse technological categories and intricate interconnections within LBM.

The rapid growth of the electric vehicle (EV) market has fueled intense research and development efforts to improve battery technologies, which are key to enhancing EV performance and driving range.

Effectively collecting information of battery technologies is the first step to analyse, group, evaluate and forecast battery integration mode. It is estimated that patents contain >90% technical information and that effective use of patents would shorten 60 and 40% of research and development (R& D) time and cost, respectively [18, 19].

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