

# Environmental impact assessment of solid-state battery production

Do solid state lithium batteries have a higher environmental impact?

Comparing the environmental impact results of all solid state lithium batteries with traditional LIBs, it was found that the environmental impact of all solid state batteries is generally higher due to differences in electrolyte materials and manufacturing processes. 2. Research methods and experimental data

Do solid-state batteries have a significant impact?

But in the material footprint, both functional units of solid-state batteries have a significant impact. The high energy density of solid-state batteries still holds great development prospects, and cleaner technology and energy, as well as higher energy density, remain the direction of battery development.

How does battery production affect the socio-economic assessment results?

The socio-economic assessment results show similarities to the environmental assessment results. Most notable, the indicator scores decrease when a solid electrolyte substitutes the liquid electrolyte. Furthermore, Fig. 5 shows that battery production has a strong influence with shares from 28 to 45% for the total battery cost.

What is the environmental impact of lithium ion batteries?

The positive and negative electrode materials of LIB are the same as those of all solid state batteries. The results indicate that in indicators such as GWP, AP, ecological potential toxicity (ETP), raw material extraction and processing account for over 50% of the environmental impact.

Do ASSB-LSB batteries reduce environmental and socio-economic impacts?

Section 4 indicates that ASSB-LSBs have the lowest indicator scores for all impact categories and thus have a high potential to reduce environmental and socio-economic impacts compared to currently used batteries. This depends mainly on the materials used in ASSB-LSB, as they are associated with lower environmental and socio-economic impacts.

What are the challenges faced by solid state battery technology?

Solid state battery technologies based on the different classes of solid electrolytes face various technological challenges such as the scale-up of material production, production of the different battery components and compatibilities between their performance aspects.

The goal of this study is to conduct a detailed environmental impact assessment of flow battery production and to evaluate the sensitivity of the results to materials selection and system ...

The review also assesses the operational environmental impact of SSBs by evaluating their energy efficiency and carbon footprint in comparison to conventional batteries, followed by an exploration ...

Overall, battery technologies associated with nickel, cobalt, and manganese exhibit the most significant environmental factor in terms of particulate pollution. Sodium-ion ...

In this investigation the environmental impacts of the manufacturing processes of a new all-solid-state battery (SSB) concept in a pouch bag housing were assessed using the ...

lithium-sulfur battery with solid electrolyte. The environmental benefits are even amplified with a higher share of renewable energy for component and battery production. Nevertheless, ...

The growing demand for lithium-ion batteries (LIBs) in smartphones, electric vehicles (EVs), and other energy storage devices should be correlated with their ...

Averaged over all chemistries, providing storage capacity for 1 kWh of electricity over the entire life cycle of a battery is associated with a CED of 0.26 kWh and GHG ...

software GaBi and the selected impact assessment method is the "tool for reduction and assessment of chemical and other environmental impacts," abbreviated as TRACI developed ...

In our study, we evaluated the environmental impact of manufacturing an all-solid-state battery with tailored oxide-based solid electrolytes for cathode and separator. With respect to cost-cutting aspects, we defined a reasonable cell ...

Explore the environmental implications of solid state batteries in our latest article. Discover how these innovative energy solutions, with their lower fire risks and higher ...

The results indicate that the lithium-sulfur battery with solid electrolyte is preferable since this battery has the best indicator scores for all impact categories ...

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