Prospects on large-scale manufacturing of solid state batteries

Can solid-state battery manufacturing achieve price parity?
This perspective highlights the state-of-the-art for solid-state battery manufacturing approaches and highlights the importance of utilizing conventional battery manufacturing approaches for achieving price parity in the near term. Decreasing material costs and improving cell architecture (biploar) may further decrease manufacturing costs.

How will the battery manufacturing industry grow over the next decade?
The battery manufacturing industry is expected to grow from 160 GWh to greater than 1000 GWhover the next decade. Resil- ient and cost-effective manufacturing methods are necessary to accommodate this growth. The majority of the manufacturing growth aims to scale up conventional lithium ion batteries (LIBs) based on liquid electrolytes (Fig. 1a).

What is solid-state battery manufacturing?
Solid oxide fuel cells require the use of gas phase reactants and thus employ porous electrodes to achieve effective ion,electron,and gas transport. Solid-state battery manufacturing will likely be a hybrid approachwhich adopts processes from both conventional LIBs and solid oxide fuel cell communities.

Do solid-state batteries cost more than conventional lithium ion batteries?
Coating costs associated with solid-state bat- teries are higherthan conventional lithium ion batteries at all process speeds. However,the margin decreases with increasing process speeds. There are additional costs to consider when the solid electrolyte is air- and moisture-sensitive.

What is a solid state battery?
All solid-state batteries that employ a solid electrolyte, instead of a liquid electrolyte, are well suited for energy dense anodes (e.g., Li metal, Si, etc.) and may be capable of extending the current driving range of an electric vehicles by nearly 2 \ (\times\).

Can electric vehicles be made from solid-state batteries?
Batteries for electric vehicles will require giga-scale production, and slow processing and manufacturing approaches will require higher capital investments, larger plants, and greater human investments. The manufacturing approach for solid-state batteries is going to be highly dependent on the material properties of the solid electrolyte.

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Explore the benefits, manufacturing challenges, and process control solutions driving the commercialization of

solid-state batteries for electric vehicles, consumer electronics, ...

This review provides an overview of solid-state batteries (SSBs) and discusses the classification of electrolytes, with a focus on challenges associated oxide- and sulphide- based SSEs, ...

This perspective highlights the state-of-the-art for solid-state battery manufacturing approaches and highlights the importance of utilizing conventional battery manufac-turing approaches for ...

All-solid-state batteries (ASSBs) are a promising response to the need for safety and high energy density of large-scale energy storage systems in challenging applications such as electric ...

The scale-up of the oxidic SSB cathode production is still in its infancy (TRL 4), associated with limited processing know-how. The overall process chain will be similar to LIB ...

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