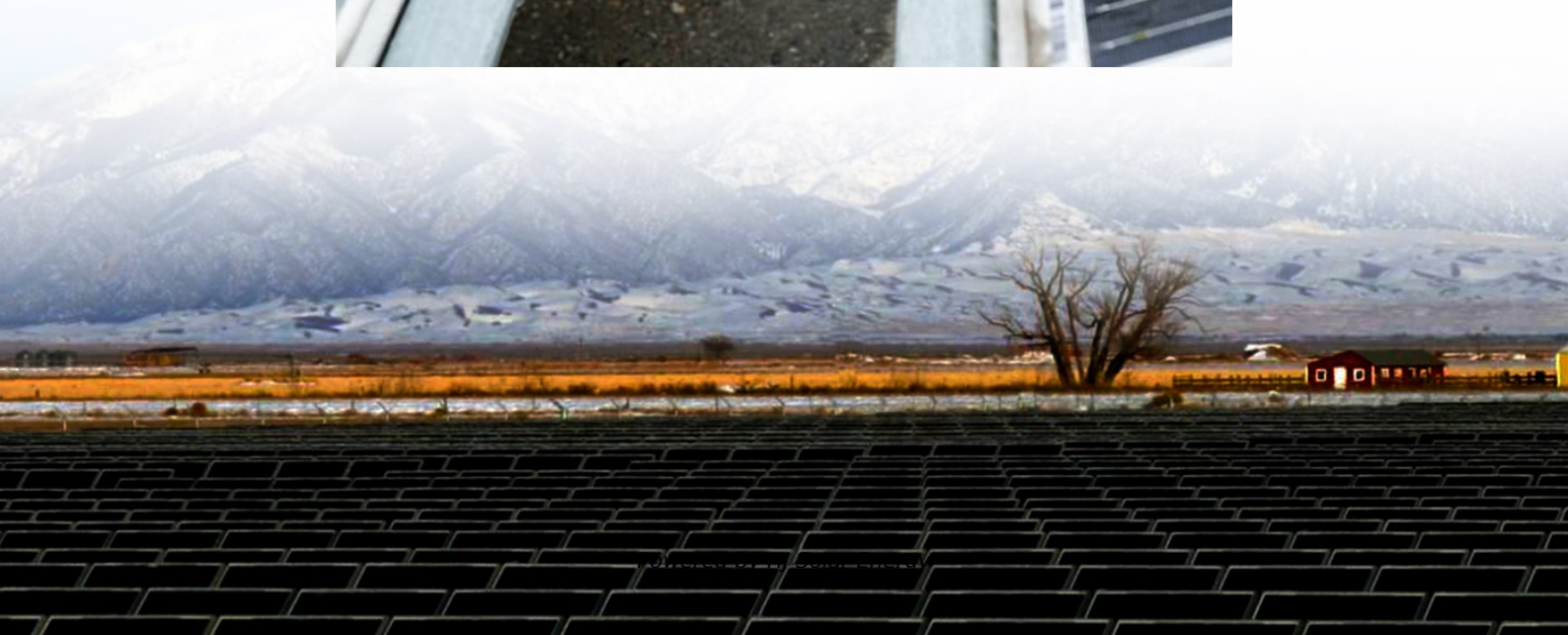


2020 roadmap on solid-state batteries





Overview

To design solid-state batteries which optimise specific energy and longer life, it is important to understand the processes happening at the interface between the solid electrolytes and cathodes, and to adopt rational approaches to solve the problems causing cell degradation.

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2020 Roadmap on Solid-State Batteries Mauro Pasta^{1,2}, David Armstrong^{1,2}, Zachary Brown^{1,2}, Junfu Bu^{1,2}, Martin R. Castell^{1,2}, Peiyu Chen^{1,2}, Alan Cocks³, Serena A. Corr^{1,4,5}, Edmund J. Cussen^{1,4,5}, Ed Darnborough^{1,2}, Vikram Deshpande⁶, Christopher Doerr^{1,2}, Matthew S. Dyer^{1,7}, Hany.

This is a repository copy of 2020 roadmap on solid-state batteries. Pasta, M. orcid.org/0000-0002-2613-4555, Armstrong, D., Brown, Z.L. orcid.org/0000-0003-0772-3159 et al. (33 more authors) (2020) 2020 roadmap on solid-state batteries. *Journal of Physics: Energy*, 2. ARTN 032008. ISSN 2515-7655.

The demand for higher density (longer range), high power (fast charging), and safer EVs has recently created a resurgence of interest in solid state batteries (SSB). Historically, research has focused on improving the ionic conductivity of solid electrolytes, yet ceramic solids now deliver. How to design a solid-state battery?

To design solid-state batteries which optimise specific energy and longer life, it is important to understand the processes happening at the interface between the solid electrolytes and cathodes, and to adopt rational approaches to solve the problems causing cell degradation.

What is the SSB roadmap?

The purpose of this Roadmap is to present an overview of the fundamental



challenges impeding the development of SSBs, the advances in science and technology necessary to understand the underlying science, and the multidisciplinary approach being taken by SOLBAT researchers in facing these challenges.

Are sulphide electrolytes suitable for solid-state batteries?

Key challenges remain in the development of sulphide electrolytes suitable for solid-state batteries, relating to stability, scale-up, and electrolyte/electrode architecture.

When will the world's first solid-state battery factory open?

In early 2022, Swiss Clean Battery (SCB) announced plans to open the world's first factory for sustainable solid-state batteries in Frauenfeld by 2024 with an initial annual production of 1.2 GWh. In July 2022, Svolt announced the production of a 20 Ah electric battery with an energy density of 350-400 Wh/kg.

Could a solid-state battery double the range of electric cars?

"Toyota preps solid-state batteries for '20s". Automotive News. Retrieved 7 January 2018. ^ a b "Solid-state battery developed at CU-Boulder could double the range of electric cars". University of Colorado Boulder. 18 September 2013. Archived from the original on 7 November 2013. Retrieved 7 January 2018.

Can solid-state batteries be used for commercial electric vehicles?

The development of commercial electric vehicles requires safer batteries capable of achieving a specific energy of 235 Wh kg^{-1} and an energy density of 500 Wh l^{-1} at cell level, with a reduction of pack cost to $\$125/\text{kWh}$. Solid-state batteries using solid electrolytes are a next-generation system that may meet these requirements.



2020 roadmap on solid-state batteries



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The purpose of this Roadmap is to present an overview of the fundamental challenges impeding the development of SSBs, the advances in science and technology ...

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Solid-state battery

A solid-state battery (SSB) is an electrical battery that uses a solid electrolyte (solectro) to conduct ions between the electrodes, instead of the liquid or gel polymer electrolytes found in conventional

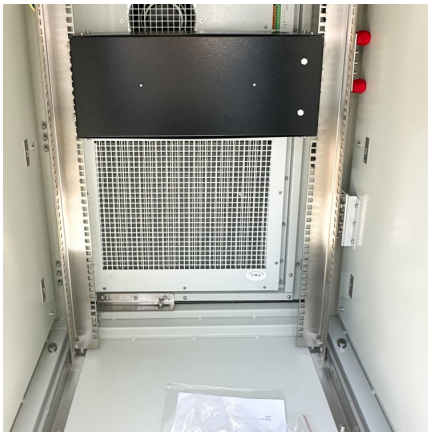


batteries. [3] Solid-state batteries ...



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The purpose of this Roadmap is to present an overview of the fundamental challenges impeding the development of SSBs, the advances in science and technology ...



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[\(PDF\) 2020 Roadmap on Solid-State Batteries](#)

In a review two years ago, we focused on the challenges and issues facing lithium metal for solid-state rechargeable batteries, pointed to the progress made in addressing this drawback, and ...



[\(PDF\) 2020 roadmap on solid-state batteries](#)

The purpose of this Roadmap is to present an overview of the fundamental challenges impeding the development of SSBs, the advances in science and technology necessary to understand the underlying

Recent advances and remaining challenges of solid-state ...

4 ???· The solid-state form and non-flammability fundamentally eliminate risks of corrosion, combustion, and explosion induced by the leakage and thermal runaway of LEs [10]. SSEs ...



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