

What are 3D-printed critical materials for secondary batteries?

Subsequently, we summarize the recent advancements in 3D-printed critical materials (anode, cathode, electrolyte, separator, and current collector) for secondary batteries, including conventional Li-ion (LIBs), Na-ion (SIBs), K-ion (KIBs) batteries, as well as Li/Na/K/Zn metal batteries, Zn-air batteries, and Ni-Fe batteries.

What are 3D-printed essential materials for rechargeable batteries?

Subsequently, we summarize recent breakthroughs in 3D-printed essential materials for rechargeable batteries, encompassing traditional Li-ion (SIBs, KIBs) batteries, Li/Na/K/Zn metal batteries, Zn-air batteries, and Ni-Fe batteries.

What are 3D printed batteries?

Instead, 3D printed batteries offer deterministic, controllable, and prescribed form factors, enabling easy battery diagnostics for their rate performance and battery cycling. Another pathway is to create 3D reconfigurable and programmable architecture induced by electrochemical lithium alloying.

Can 3D batteries take arbitrary form factors?

When battery components can take arbitrary form factors, opportunities emerge for creating electrode configurations with improved power density, reduced weight, and excellent mechanical stability. We provide a perspective on recent progress in AM of 3D batteries, discussing relevant techniques, materials, designs, and applications.

Can 3D batteries be used as multifunctional batteries?

In particular, mechanically resilient 3D batteries such as 3D carbon electrodes manufactured via VP could be useful as multifunctional batteries, with promise in aerospace applications that require lighter battery and structural components.

What are the potential pathways of 3D printed batteries?

Other potential pathways of 3D printed batteries are battery diagnostics and electrochemically reconfigurable materials. Battery characterizations are limited to material evaluations or characterizations of commercially available slurry electrodes.

The next frontier, they say, is the solid-state battery -- and perhaps 3D-printed ones, at that. Recently, ... The technology allows the company to deposit multiple materials ...

Conventional manufacturing can process more battery materials than 3D printing since the latter methods are still primal (e.g., a lack of quick customization on delicate structures, defect density, ink tunability, and feedstock size/shape ...

Here, for the first time, a 3D-printed Ag-Ga battery is introduced through subsequent printing of four sinter-free composites: a stretchable Liquid Metal (LM) EGaIn-Ag ...

3D-printed materials in ZIBs. (a) Schematic diagram of a 3D printing battery and SEM images of CNT@MnO<sub>2</sub>. (b) Photograph of the multinozzle printing system. Reproduced ...

Ultimately, a 3D battery electrode was developed incorporating a gradient of pore distribution to achieve density changes in the active material. This is the first case of ...

Understanding 3D printing designs in battery materials and architectures is key to optimize performance and realize the customization of 3D-printed batteries. In this Review, ...

Discover the materials shaping the future of solid-state batteries (SSBs) in our latest article. We explore the unique attributes of solid electrolytes, anodes, and cathodes, ...

A render of a Sakuu battery 3D printing "gigafactory." Image via Sakuu. 3D printed batteries. Previously, Lawrence Livermore National Laboratory (LLNL) collaborated ...

Blackstone Resources, a Swiss investment firm focused on battery technology, has announced the series production of its 3D printed battery cells at its new manufacturing ...

3D microbatteries are proposed as a step change in the energy and power per footprint of surface mountable rechargeable batteries for microelectromechanical systems (MEMS) and other ...

electronics. Understanding 3D printing designs in battery materials and architectures is key to optimize performance and realize the customization of 3D ...

The simulation and experimental results demonstrated that the interdigitated battery design enabled by 3D printing has the potential to overcome the trade-off between ...

Benefiting from these unique structural properties, 3D NGA could thus simultaneously promise a high-energy-density and long-cycle-life Li-S battery at a high sulfur ...

Bioinspired 3D materials for batteries refer to materials designed for batteries that mimic natural structures or functions [37], [38], [39]. Structures exhibiting hierarchical ...

The DIW of a PVDF-co-HFP material and its performance as a separator indicated the development of a fully solid-state 3D printed interdigitated lithium-ion battery . ...

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