New material technology for lithium batteries

Researchers from the Harvard John A. Paulson School of Engineering and Applied Sciences (SEAS) have developed a new lithium metal battery that can be charged ...

With a focus on next-generation lithium ion and lithium metal batteries, we briefly review challenges and opportunities in scaling up lithium-based battery materials and components to accelerate ...

New batteries are coming to America. This week, Ford announced plans for a new factory in Michigan that will produce lithium iron phosphate batteries for its electric vehicles. The plant, expected ...

University of Texas at Austin researchers have created a new sodium-based battery material that is highly stable, capable of recharging as quickly as a traditional lithium-ion battery and able to pave the way toward delivering more ...

Sodium-ion also opens up new opportunities for scientists to experiment with new elements and materials that didn"t play nice with lithium. This allows for the increase in manganese and iron ...

The 2019 Nobel Prize in Chemistry has been awarded to John B. Goodenough, M. Stanley Whittingham and Akira Yoshino for their contributions in the development of lithium-ion batteries, a technology ...

The next generation of lithium-ion batteries for your smartphone, laptop or electric vehicle could be cobalt-free, according to recent research in ACS Central Science. ... the new composite cathode cycled safely more than 2,000 times, delivered an energy density higher than most cobalt-based cathodes and charged-discharged in as little as six ...

MIT researchers have improved the energy density of nonrechargeable, or "primary," batteries, such as the batteries used in pacemakers and other implantable medical devices. They say it could enable ...

Now the MIT spinout 24M Technologies has simplified lithium-ion battery production with a new design that requires fewer materials and fewer steps to manufacture each cell. The company says the design, which it calls ...

PROVIDENCE, R.I. [Brown University] -- In pursuit of batteries that deliver more power and operate more safely, researchers are working to replace the liquids commonly used in today"s lithium ion batteries ...

The new application of this electrode material was found "somewhat serendipitously," after it had initially been developed a few years ago by Shao-Horn, Johnson, and others, in a collaborative venture aimed at lithium-air battery development. "There"s still really nothing that allows a good rechargeable lithium-air battery," Johnson says.

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A multi-institutional research team led by Georgia Tech"s Hailong Chen has developed a new, low-cost cathode that could radically improve lithium-ion batteries (LIBs) -- potentially transforming the electric vehicle (EV) market and large-scale energy storage systems. "For a long time, people have been looking for a lower-cost, more sustainable alternative to ...

A lithium-ion or Li-ion battery is a type of rechargeable battery that uses the reversible intercalation of Li + ions into electronically conducting solids to store energy. In comparison with other commercial rechargeable batteries, Li-ion batteries are characterized by higher specific energy, higher energy density, higher energy efficiency, a longer cycle life, and a longer ...

The first rechargeable lithium battery was designed by Whittingham (Exxon) and consisted of a lithium-metal anode, a titanium disulphide (TiS 2) cathode (used to store Li-ions), and an electrolyte composed of a lithium salt dissolved in an organic solvent. 55 Studies of the Li-ion storage mechanism (intercalation) revealed the process was ...

Microsoft says the new material could cut down the amount of lithium used in a battery by as much as 70 percent. On top of that, it could be used to create a solid-state battery that"s...

New materials discovered for safe, high-performance solid-state lithium-ion batteries. ScienceDaily . Retrieved October 30, 2024 from / releases / 2024 / 04 / 240402140030.htm

A team led by engineers at the University of California San Diego developed a new cathode material for solid-state lithium-sulfur batteries that is electrically conductive and structurally healable--features that overcome the limitations of these batteries" current cathodes. The work was recently published in the journal Nature.

Dec. 20, 2021 -- To overcome the slow charging times of conventional lithium-ion batteries, scientists have developed a new anode material that allows for ultrafast charging. Produced via a ...

PROVIDENCE, R.I. [Brown University] -- In pursuit of batteries that deliver more power and operate more safely, researchers are working to replace the liquids commonly used in today"s lithium ion batteries with solid materials. Now, a research team from Brown University and the University of Maryland has developed a new material for use in solid-state ...

The team at the laboratory analyzed the top candidates and made a handful of the hypothetical materials dreamed up by computers. The new material chosen for the prototype contains some lithium ...

Microsoft announced Tuesday that a team of scientists used artificial intelligence and high-performance computing to plow through 32.6 million possible battery materials - ...

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Microsoft and Pacific Northwest National Laboratory (PNNL) might be on the verge of a breakthrough that will see the use of lithium in batteries reduced by up to 70%. The scientists leveraged...

A brand new substance, which could reduce lithium use in batteries, has been discovered using artificial intelligence (AI) and supercomputing. The findings were made by Microsoft and the...

12 · Telegram. A breakthrough at Cornell involving a new crystal design could be the key to stopping battery explosions. This new design enables lithium ions to flow freely and ...

6 · To address the rapidly growing demand for energy storage and power sources, large quantities of lithium-ion batteries (LIBs) have been manufactured, leading to severe shortages of lithium and cobalt resources. Retired lithium-ion batteries are rich in metal, which easily causes environmental hazards and resource scarcity problems. The appropriate disposal of retired ...

Researchers are working to adapt the standard lithium-ion battery to make safer, smaller, and lighter versions. An MIT-led study describes an approach that can help researchers consider what materials may work ...

This year could be a breakout year for one alternative: lithium iron phosphate (LFP), a low-cost cathode material sometimes used for lithium-ion batteries.

A new approach to analyzing and designing new ion conductors -- a key component of rechargeable batteries -- could accelerate the development of high-energy lithium batteries, and possibly other energy storage and delivery devices such as ...

The researchers queried AQE for battery materials that use less lithium, and it quickly suggested 32 million different candidates. From there, the AI system had to discern which of those materials ...

Nature Materials - A new twist for lithium batteries. The new electrode material is based on a motif, called a helical perylene diimide (hPDI), that has already been explored for photosensors ...

LIBs have been the dominant electrochemical energy-storage technology/device since its commercialization in 1990s. In commercial LIBs, LiFePO 4, LiCoO 2, and lithium nickel manganese cobalt oxide (NMC) 1 compounds are widely used as cathodes, with graphite still almost exclusively used as anode. As the energy density and capacity ...

Now the MIT spinout 24M Technologies has simplified lithium-ion battery production with a new design that requires fewer materials and fewer steps to manufacture each cell. The company says the design, which it calls "SemiSolid" for its use of gooey electrodes, reduces production costs by up to 40 percent.

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12 · At the top of Zhong"s list of potential topics was finding a way to make a safer lithium-ion battery. In conventional lithium-ion batteries, the ions are shuttled along via liquid electrolytes. But liquid electrolytes can form spiky dendrites between the battery"s anode and cathode, which short out the battery or, in rare cases, explode.

Technical University of Denmark patents an easily sourced potassium silicate material for next-generation batteries. ... DTU researcher Mohamad Khoshkalam has invented a new material based on rock silicates for a solid-state electrolyte that has the potential to replace lithium in future electric car batteries. ... DTU"s innovative research on ...

Engineers have developed a new cathode material for solid-state lithium-sulfur batteries that is electrically conductive and structurally healable. ... The article I read says, "The team is working to further advance the solid-state lithium-sulfur battery technology by improving cell engineering designs and scaling up the cell format." How ...