

BOLETÍN DE VIGILANCIA TECNOLÓGICA E INTELIGENCIA COMPETITIVA

ALMACENAMIENTO DE ENERGÍA

ENERO - FEBRERO 2022



BATTERYPLAT

ÍNDICE

NOTICIAS

1. Emerging technologies, efficient processes: inside energy storage methods 2
2. The world's largest lithium ion battery is down, again 2
3. Wafer-thin supercapacitor stays strong when bent out of shape 3
4. Scientists engineer new material that can absorb and release enormous amount... 3
5. Recycled Lithium-Ion Batteries Can Perform Better Than New Ones 4
6. Flow battery systems and their future in stationary energy storage 4
7. The Battery Report 2021 by Volta Foundation 5

EMPRESAS Y MERCADOS

8. Viologen redox flow battery for renewables storage 6
9. Amprius ships first batch of "world's highest density" batteries 6
10. The companies that will disrupt the way we store energy 7
11. Energy Vault inks massive China deal for gravity-based storage project 7
12. Yotta Energy Partners with Cal Solar Inc. to Deploy Energy Storage and Sola... 8
13. PearlX and SolarEdge Behind New Community Solar & Storage Virtual Power Pla... 8
14. The Hottest Energy Storage IPOs In 2022 8

PATENTES

15. Air conditioning system for energy storage device, and energy storage syste... 9
16. Combined-cycle plant with thermal energy storage 9
17. Combined-cycle power plant with thermal energy storage 10
18. DC-DC converter for solar linked energy storage system and control method t... 10
19. Energy storage device and energy storage system 11
20. Method for implementing power delivery transaction for potential electrical... 11
21. Pumped heat energy storage system with generation cycle thermal integration 12
22. Pumped heat energy storage system with load following 12
23. Systems and methods for enhancing electrical energy storage 13
24. Railway vehicle including an energy storage system 13

ÍNDICE

25. Dielectric energy storage systems	14
26. Apparatus and method for operating energy storage system	14
27. Cooling system and method for energy storage	15
28. Electrical energy storage device	15
29. Heat pipe type thermal management device and method for energy storage batt...	16
30. High-temperature thermochemical energy storage materials using doped magnes...	16
31. High-voltage hierarchy hundred-megawatt level battery energy storage system	17
32. Liquefied air energy storage peak regulation system and method based on int...	17
33. Method, System, and Apparatus for the Thermal Storage of Nuclear Reactor Ge...	18
34. Modular DC circuit breaker with integrated energy storage for future dc net...	18
35. Multi-branch electrochemical energy storage system having battery cell diag...	19
36. Porous energy-storing fiber electrode using colloid template, energy storag...	19
37. Pressure-resistant positive active material and electrochemical energy stor...	20
38. Remote controllable hybrid energy storage vehicle	20
39. Thermal management system for an energy storage container	21
40. Heat exchange module for an energy storage module, and a production method ...	21
41. Electrochemical energy storage cell	22
42. Electrodes and currents through the use of organic and organometallic high ...	22
43. Energy storage power supply, parallel control device for energy storage pow...	23
44. Energy storage rolling capacity check including in-situ life model comparis...	23
45. Gravity-based energy storage system	24
46. Power generation control with an energy storage system	24
47. Thermo-electrochemical convertor with integrated energy storage	25

PUBLICACIONES CIENTÍFICAS

48. Analysis and optimization of a novel energy storage flywheel for improved e...	26
49. Multi-stage dynamic optimal allocation for battery energy storage system in...	26
50. Optimal Stochastic Deployment of Heterogeneous Energy Storage in a Resident...	27
51. Battery Energy Storage Systems Allocation Considering Distribution Network ...	27
52. Developing a framework for a retail electricity model incorporating energy ...	28

ÍNDICE

53. Real-Time Model Predictive Control of Battery Energy Storage Active and Rea...	28
54. Balancing responsibilities:Effects of growth of variable renewable energy, ...	29
55. Power conversion in a gridconnected residential PV system with energy stor...	29
56. Uncertainty-Cognizant Model Predictive Control for Energy Management of Res...	30
57. Indoor thermal environment in a rural dwelling heated by air-source heat pu...	30
58. Highly Stable Low Redox Potential Quinone for Aqueous Flow Batteries	31
59. In Situ Secondary Phase Modified Low-Strain Na ₃ Ti(PO ₃) ₃ N Cathode Achieving ...	31

NOTICIAS

Emerging technologies, efficient processes: inside energy storage methods

Publicada en <https://www.power-technology.com>, 20/02/2022.

As renewables make up an increasingly large share of the world's energy mix, efficient storage solutions will be needed to make the most of this power potential. JP Casey profiles some of the emerging and established methods of energy storage in the world today.



[ver más...](#)

The world's largest lithium ion battery is down, again

Publicada en <https://pv-magazine-usa.com>, 12/02/2022.

The Moss Landing Energy Storage Facility Phase II set off fire alarms that activated a fault water suppression system, which – again – set off a cascading set of events that resulted in roughly ten battery packs melting down.



[ver más...](#)

Wafer-thin supercapacitor stays strong when bent out of shape

Publicada en <https://newatlas.com>, 09/02/2022.

Scientists have developed a new type of supercapacitor with the kind of flexibility and durability needed to feature in footwear and clothing, along with other devices making up the Internet of Things. The advance stems from a novel manufacturing method that produces a wafer-thin energy storage device that can be bent and stretched out of shape, all the while maintaining its impressive performance.

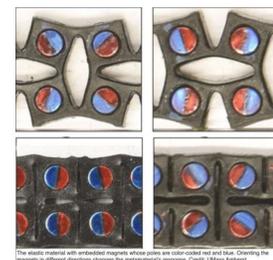


[ver más...](#)

Scientists engineer new material that can absorb and release enormous amounts of energy

Publicada en <https://phys.org>, 02/02/2022.

A team of researchers from the University of Massachusetts Amherst recently announced in the Proceedings of the National Academy of Sciences that they had engineered a new rubber-like solid substance that has surprising qualities. It can absorb and release very large quantities of energy. And it is programmable.



[ver más...](#)

Recycled Lithium-Ion Batteries Can Perform Better Than New Ones

Publicada en <https://www.scientificamerican.com>, 01/02/2022.

A novel method of recycling such batteries could help meet skyrocketing demand. Lithium-ion batteries are at the heart of nearly every electric vehicle, laptop and smartphone, and they are essential to storing renewable energy in the face of the climate emergency. But all of the world's current mining operations cannot extract enough lithium and other key minerals to meet skyrocketing demand for these batteries.



[ver más...](#)

Flow battery systems and their future in stationary energy storage

Publicada en <https://www.batteryplat.com/>, 01/01/2022.

On 9th July 2021, at the Summer Symposium of the International Flow Battery Forum, the FLORES Network of Flow-Battery Research Initiatives held a workshop to identify research needs, barriers, potential markets and impacts of flow batteries. The outcomes, including resulting policy recommendations, are provided here.



[ver más...](#)

The Battery Report 2021 by Volta Foundation

Publicada en <https://www.batteryplat.com>, 01/01/2022.

In this annual report, we summarize what we consider to be the most significant developments in the battery industry in 2021. This report seeks to provide a comprehensive and accessible overview of the current state of battery research, industry, talent, and policy. We hope to catalyze in-depth conversations on the state of batteries and its trajectory into the future.



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EMPRESAS Y MERCADOS

Viologen redox flow battery for renewables storage

Publicada en <https://www.pv-magazine.com>, 16/02/2022.

Conceived for the storage of residential and large scale renewable energy, the device has a rated power of over 150mW/cm², an energy density exceeding 40Wh/L, and a power density of 72.5mW/cm². The battery was built with an anode made of inexpensive viologen and its cost, according to its creators, may be lower than \$100/kWh.



[ver más...](#)

Ampricus ships first batch of "world's highest density" batteries

Publicada en <https://newatlas.com>, 13/02/2022.

Californian company Ampricus has shipped the first batch of what it claims are the most energy-dense lithium batteries available today. These silicon anode cells hold 73 percent more energy than Tesla's Model 3 cells by weight, and they take up 37 percent less volume.



[ver más...](#)

The companies that will disrupt the way we store energy

Publicada en <https://www.israel21c.org>, 08/02/2022.

To have a sustainable planet, we need not just renewable energies, but an efficient way to store that power. These technologies aim to do just that. For electric vehicles, too. Generating power, whether from fossil fuels or renewable resources, is complicated and expensive. Storing that generated energy is no less complex and energy intensive.



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Energy Vault inks massive China deal for gravity-based storage project

Publicada en <https://reneweconomy.com.au>, 02/02/2022.

The gravity-based, long duration energy storage technology of Swiss company Energy Vault has gained a foothold in the potentially massive China market, through a deal that will kick off with a 100MWh project in the Jiangsu Province in the second half of the year.



[ver más...](#)

Yotta Energy Partners with Cal Solar Inc. to Deploy Energy Storage and Solar Technology Across California

Publicada en altenergymag, 14/01/2022.

The two companies will focus on integrating distributed energy solutions in commercial, public works, and multifamily properties as new state mandates are announced.

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PearlX and SolarEdge Behind New Community Solar & Storage Virtual Power Plants to Bring Energy Equality to Renters in Texas

Publicada en altenergymag, 14/01/2022.

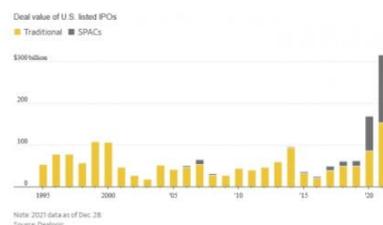
Leveraging the pooled on-site power supply by tenants, local utilities will purchase excess solar energy produced to support and stabilize the grid during peak demands - enabling tenants to enjoy even greater cost savings.

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The Hottest Energy Storage IPOs In 2022

Publicada en <https://markets.businessinsider.com/>, 03/01/2022.

One of the biggest electric-vehicle battery companies in the world is going public. After years of disappointment, the U.S. IPO market has been recording a strong comeback. Traditional initial public offerings raised more money than ever before in 2021, as early investors tried to cash in on sky-high valuations. This year, a record nearly 400 traditional IPOs and an additional 600 special-purpose acquisition companies (SPACs) listed on the markets. Total deal value for traditional IPOs clocked in at \$153.5B while SPACs fetched \$162.3B, both record highs.



[ver más...](#)

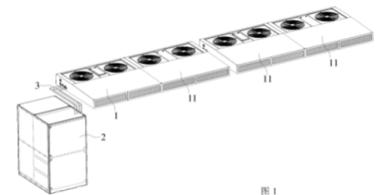
PATENTES

Air conditioning system for energy storage device, and energy storage system

Publicada en Tecnologías asociadas a almacenamiento de energía, 17/02/2022.

Solicitante: BYD COMPANY LIMITED [CN]

The present application relates to an air conditioning system for an energy storage device, and an energy storage system. The air conditioning system comprises an internal circulation module and an external circulation module, wherein the internal circulation module is connected to the external circulation module by means of a refrigerant pipe, the internal circulation module is placed inside an energy storage device, and the external circulation module is placed on the top of the energy storage device.



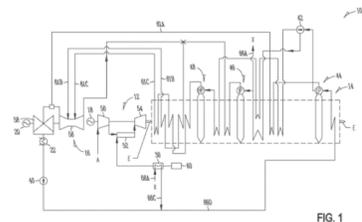
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Combined-cycle plant with thermal energy storage

Publicada en Tecnologías asociadas a almacenamiento de energía, 17/02/2022.

Solicitante: MITSUBISHI POWER AMERICAS, INC. [US]/

A power plant can comprise a gas turbine productive of an exhaust gas, a steam turbine, a heat recovery steam generator that extracts heat from gas turbine exhaust gas and supplies fluid to the steam turbine, a thermal storage unit storing a thermal storage working medium that is configured to discharge thermal energy into the fluid supplied from the heat recovery steam generator to supplement power generation by the steam turbine, a first heat exchanger disposed within the heat recovery steam generator to transfer thermal energy from the exhaust gas to the thermal storage working medium,



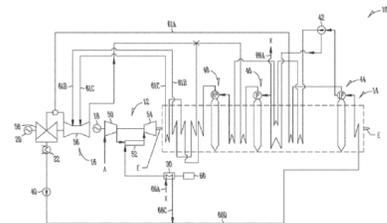
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Combined-cycle power plant with thermal energy storage

Publicada en Tecnologías asociadas a almacenamiento de energía, 17/02/2022.

Solicitante: Mitsubishi Power Americas, Inc.

A power plant can comprise a gas turbine productive of an exhaust gas, a steam turbine, a heat recovery steam generator that extracts heat from gas turbine exhaust gas and supplies fluid to the steam turbine, a thermal storage unit storing a thermal storage working medium that is configured to discharge thermal energy into the fluid supplied from the heat recovery steam generator to supplement power generation by the steam turbine



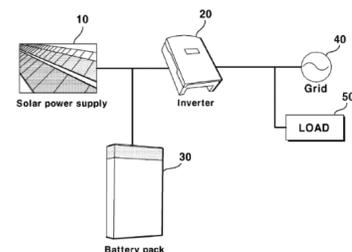
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DC-DC converter for solar linked energy storage system and control method thereof

Publicada en Tecnologías asociadas a almacenamiento de energía, 17/02/2022.

Solicitante: LG INNOTEK CO., LTD.

According to an embodiment, disclosed are a DC-DC converter for compensating for a ripple, in a solar linked energy storage system, and a control method thereof. In particular, disclosed is a DC-DC converter for compensating for a ripple generated in a DC link where a single phase inverter and a converter are connected. The DC-DC converter may obtain a frequency of a grid to compensate for the ripple.



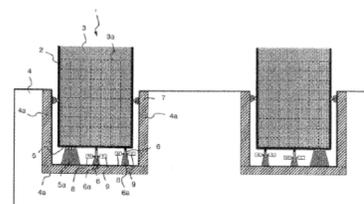
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Energy storage device and energy storage system

Publicada en Tecnologías asociadas a almacenamiento de energía, 17/02/2022.

Solicitante: Christian Spinner

A method is provided for operating an energy storage device that has a horizontal flywheel (1). The flywheel (1) has a mass ring made of concrete (3) and is at least partially embedded in the soil (4). The method includes operating a motor with energy from a first energy source to drive the flywheel (8) at a specified rotational speed and to store energy in the flywheel (1). The method then includes introducing to the motor (8) energy from a renewable energy source in a sufficient amount so that the energy from the renewable energy source and the energy stored in the flywheel (1) maintain rotation of the flywheel at the specified rotational speed.



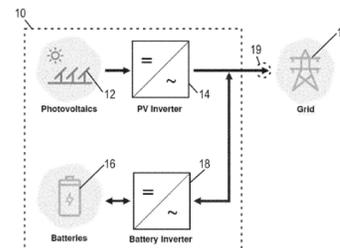
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Method for implementing power delivery transaction for potential electrical output of integrated renewable energy source and energy storage system facility

Publicada en Tecnologías asociadas a almacenamiento de energía, 17/02/2022.

Solicitante: 8ME NOVA, LLC

Methods for implementing power delivery transactions between a buyer and a seller of electrical energy supplied to an electrical grid by an integrated renewable energy source (RES) and energy storage system (ESS) of a RES-ESS facility are provided. Estimated total potential output of the RES is compared to a point of grid interconnect (POGI) limit to identify potential RES overgeneration, and the buyer is charged if potential RES overgeneration is less than potential overgeneration during one or more retrospective time windows. The method provides a basis for the RES-ESS facility owner to be paid for an estimated amount of energy that did not get stored as a result of a grid operator not fully discharging an ESS prior to the start of a new day.



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Pumped heat energy storage system with generation cycle thermal integration

Publicada en Tecnologías asociadas a almacenamiento de energía, 17/02/2022.

Solicitante: MALTA INC. [US]

A first system herein may include: (i) a pumped-heat energy storage system ("PHES system"), wherein the PHES system is operable in a generation mode to convert at least a portion of stored thermal energy into electricity, wherein the PHES system includes a working fluid path circulating a working fluid through, in sequence, at least a compressor system, a hot-side heat exchanger system, a turbine system, a cold-side heat exchanger system, and back to the compressor system; and (ii) a fluid path directing a first fluid through an intercooler and to a power generation plant, and wherein the working fluid path through the compressor system includes circulating the working fluid through, in sequence, at least a first compressor, the intercooler, and a second compressor, and wherein the intercooler thermally contacts the working fluid with the first fluid, transferring heat from the working fluid to the first fluid.

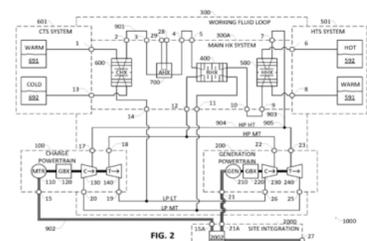
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Pumped heat energy storage system with load following

Publicada en Tecnologías asociadas a almacenamiento de energía, 17/02/2022.

Solicitante: MALTA INC. [US]

A method including: (i) receiving a first amount of electricity into a pumped-heat energy storage system ("PHES system") from a power generation plant supplying a second amount of electricity to an electrical grid; (ii) operating the PHES system in a charge mode, converting at least a portion of the received first amount of electricity to stored thermal energy



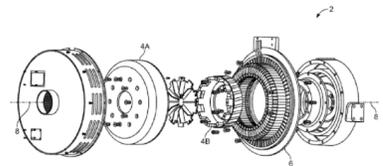
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Systems and methods for enhancing electrical energy storage

Publicada en Tecnologías asociadas a almacenamiento de energía, 17/02/2022.

Solicitante: ClearWater Holdings, Ltd.

An electrical energy storage device comprises a housing having a first end, a second end, a first side, and a second side; a first electrode disposed in the housing adjacent the first side; a second electrode disposed in the housing adjacent the second side; and an electrolyte mixture disposed between the first electrode and the second electrode, the electrolyte mixture containing a plurality of ions. In an implementation, a channel disposed in the housing permits ions to flow adjacent to the first end and a barrier in the housing prevents ions from flowing adjacent to the second end. In another implementation, some of the ions are magnetic. In a further implementation, some of the ions have a greater density than other ions.



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Railway vehicle including an energy storage system

Publicada en Tecnologías asociadas a almacenamiento de energía, 16/02/2022.

Solicitante: HITACHI RAIL LTD

A railway vehicle 10 includes an energy storage system (105, figure 1) comprising rechargeable batteries for providing electrical power to a traction motor of a train drive system, and at least one casing 3 forming a chamber in which the batteries are sealingly housed. The railway vehicle further includes an exhaust system 4 for collection and discharge of combustion fumes generated by accidental combustion of the batteries. The exhaust system provides a collection duct 4b which opens to the chamber 3 for collection of combustion fumes.

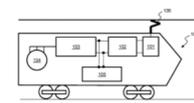
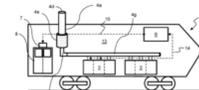


Fig. 1

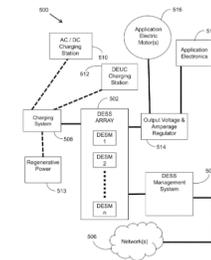


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Dielectric energy storage systems

Publicada en Tecnologías asociadas a almacenamiento de energía, 15/02/2022.

Solicitante: Blue Horizons Innovations, LLC
 A Dielectric Energy Storage System (DESS) and method that stores energy for a wide variety of applications.

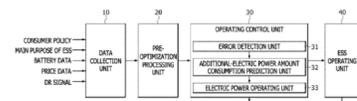


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Apparatus and method for operating energy storage system

Publicada en Tecnologías asociadas a almacenamiento de energía, 10/02/2022.

Solicitante: Korea Advanced Institute of Science and Technology
 The energy storage system operating apparatus and method includes a pre-optimization processing unit configured to generate an operating schedule, which is for operating the energy storage system during a set period, for each predetermined section by reflecting electric power billing environment data in at least one of a consumer policy and operating characteristics of the energy storage system and configured to set an electric power reserve to prepare for a shortage of an electric power amount



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Cooling system and method for energy storage

Publicada en Tecnologías asociadas a almacenamiento de energía, 10/02/2022.

Solicitante: CATERPILLAR INC. [US]

An energy storage device cooling system (12) includes a housing (56), at least one energy storage device (58) within the housing (56), and a coolant circuit (60) including a first flow portion (62) extending through the housing (56), the coolant circuit (60) configured to supply coolant for heat exchange with the at least one energy storage device (58).

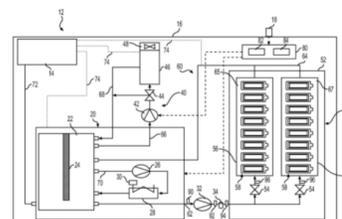


FIG. 1

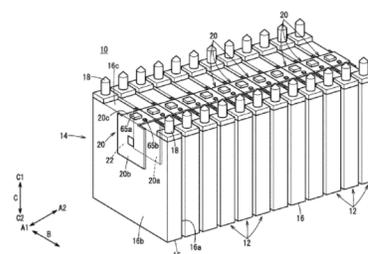
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Electrical energy storage device

Publicada en Tecnologías asociadas a almacenamiento de energía, 10/02/2022.

Solicitante: HONDA MOTOR CO., LTD.

An electrical energy storage device is constituted by connecting together a plurality of battery cells. Each of the battery cells includes a transformer forming unit constituted by a first inductor, a second inductor, a first core member, and a second core member, and which is capable of forming a transformer between itself and an adjacent battery cell, and a potential detection unit that detects the potential of the battery cell. A control unit compares the potentials of the adjacent battery cells based on measurement results of a potential detection unit.

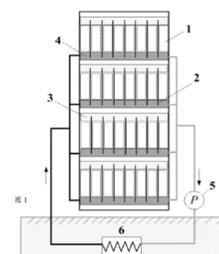


[ver más...](#)

Heat pipe type thermal management device and method for energy storage battery module

Publicada en Tecnologías asociadas a almacenamiento de energía, 10/02/2022.

Solicitante: HUANENG CLEAN ENERGY RESEARCH INSTITUTE [CN]
 Provided are a heat pipe type thermal management device and method for an energy storage battery module (1). The device comprises battery modules (1) and a heat exchanger (6), wherein heat pipes (2) are provided between adjacent batteries in the battery modules (1); cold flow channels (3) are provided on the top of the battery modules (1), and heat flow channels (4) are provided at the bottom of the battery modules (1); lower ends of the heat pipes (2) are inserted into the heat flow channels (4), and upper ends of the heat pipes (2) are inserted into the cold flow channels (3)

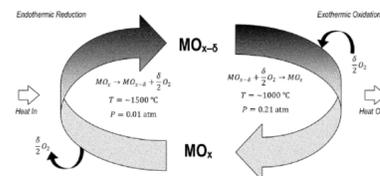


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High-temperature thermochemical energy storage materials using doped magnesium-transition metal spinel oxides

Publicada en Tecnologías asociadas a almacenamiento de energía, 10/02/2022.

Solicitante: Arizona Board of Regents on behalf of Arizona State University
 High-temperature thermochemical energy storage materials using doped magnesium-transition metal spinel oxides are provided. —transition metal spinel oxides, such as magnesium manganese oxide (MgMn)3O4, are promising candidates for high-temperature thermochemical energy storage applications.



[ver más...](#)

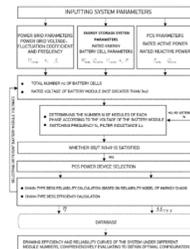
High-voltage hierarchy hundred-megawatt level battery energy storage system

Publicada en Tecnologías asociadas a almacenamiento de energía, 10/02/2022.

Solicitante: SHANGHAI JIAO TONG UNIVERSITY

A high-voltage hierarchy hundred-megawatt level (100 MW) battery energy storage system and optimizing and control methods are provided. The system includes a multi-phase structure, of which each phase is divided into multi-story spaces from top to bottom. A battery module is provided in each story of the multi-story spaces. The battery module is connected to a DC terminal of an H-bridge converter, and each phase is cascaded by the H-bridge converter. A capacity of the single-phase energy storage apparatus of the present invention is large, and multiple phases can be connected in parallel to form a 100 MW battery energy storage power station.

[ver más...](#)



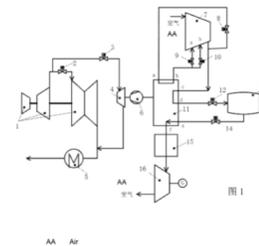
Liquefied air energy storage peak regulation system and method based on intermediate suction of compressor

Publicada en Tecnologías asociadas a almacenamiento de energía, 10/02/2022.

Solicitante: XI'AN TPRI ENERGY CONSERVATION TECHNOLOGY CO., LTD [CN]

A liquefied air energy storage peak regulation system and method based on the intermediate suction of a compressor. The system comprises a first steam turbine group (1), a second steam turbine group (4), a condenser (5), a refrigeration compressor (6), an air compressor (7), a cascade refrigeration/cold storage system (11), a liquid air storage tank (13), an air heating device (15), an air expander (16) and a control valve. The operation method of the system comprises an energy storage mode and an energy release mode. The system utilizes excess steam to drive the cascade refrigeration/cold storage system (11), reducing energy transfer loss and substantially reducing cryogenic production costs.

[ver más...](#)

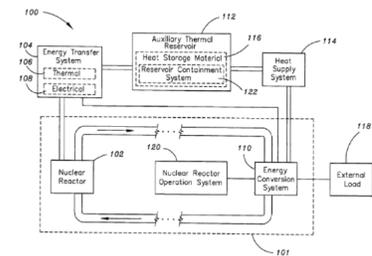


Method, System, and Apparatus for the Thermal Storage of Nuclear Reactor Generated Energy

Publicada en Tecnologías asociadas a almacenamiento de energía, 10/02/2022.

Solicitante: TerraPower, LLC

A method, system, and apparatus for the thermal storage of nuclear reactor generated energy including diverting a selected portion of energy from a portion of a nuclear reactor system to an auxiliary thermal reservoir and, responsive to a shutdown event, supplying a portion of the diverted selected portion of energy to an energy conversion system of the nuclear reactor system.



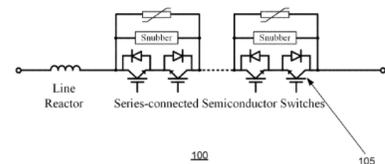
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Modular DC circuit breaker with integrated energy storage for future dc networks

Publicada en Tecnologías asociadas a almacenamiento de energía, 10/02/2022.

Solicitante: Ohio State Innovation Foundation

A T-breaker is an all-in-one solution for dc microgrid fault protection, power flow control, and power quality improvement. A T-breaker features a modular multilevel “T” structure with integrated energy storage devices. The two horizontal arms of the T-breaker realize fault current breaking, load voltage compensation, and power flow control; and the vertical arm of the T-breaker realizes shunt compensation. The configuration provides excellent voltage scalability and relaxes the requirements on the switching signal synchronization during fault transients. The local energy storage in sub-modules eases the fault energy dissipation requirement placed on the traditionally-adopted surge arrestors. The modular multilevel structure also offers immense control flexibility for all types of targeted functions of the provided T-breaker.



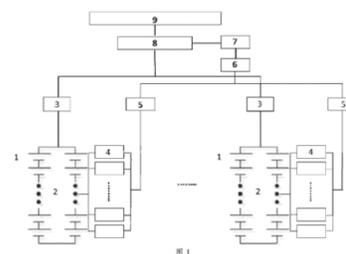
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Multi-branch electrochemical energy storage system having battery cell diagnosis function

Publicada en Tecnologías asociadas a almacenamiento de energía, 10/02/2022.

Solicitante: HUANENG CLEAN ENERGY RESEARCH INSTITUTE [CN]

A multi-branch electrochemical energy storage system having a battery cell diagnosis function. Each battery cluster (2) corresponds to one second-level battery management system (5) and one bidirectional DC-AC converter (3); battery clusters (2) each comprise several battery modules (1), wherein each battery module (1) corresponds to one first-level battery management system (4); first-level battery management systems (4) corresponding to the battery modules (1) in each battery cluster (2) are connected to the second-level battery management system (5) corresponding to the battery cluster (2)



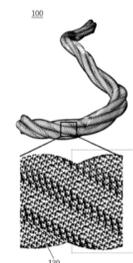
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Porous energy-storing fiber electrode using colloid template, energy storage apparatus comprising same, and method for producing same

Publicada en Tecnologías asociadas a almacenamiento de energía, 10/02/2022.

Solicitante: INDUSTRIAL COOPERATION FOUNDATION CHONBUK NATIONAL UNIVERSITY [KR]

The present invention relates to a porous energy-storing fiber electrode using a colloid template, an energy storage apparatus comprising the fiber electrode, and a method for producing the energy storage apparatus, the porous energy-storing fiber electrode, which uses a colloid template, comprising a porous structure made of a fiber support, and conductive material wrapping the surface of the support by means of the colloid template provided thereon.

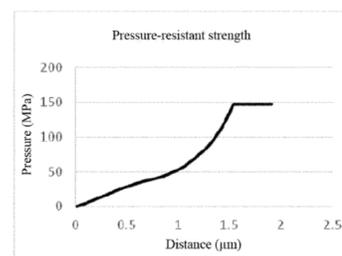


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Pressure-resistant positive active material and electrochemical energy storage apparatus

Publicada en Tecnologías asociadas a almacenamiento de energía, 10/02/2022.

Solicitante: CONTEMPORARY AMPEREX TECHNOLOGY CO., LIMITED
This application relates to the field of battery technologies, and in particular, to a pressure-resistant positive active material and an electrochemical energy storage apparatus. The positive active material includes secondary particles composed of primary particles, and a quantity of primary particles per unit sphere area in a SEM graph of the secondary particles is 5/m² to 30/m². A single-particle pressure-resistant strength of the secondary particles is 60 MPa to 300 MPa.

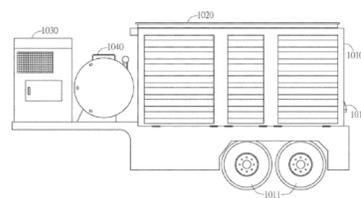


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Remote controllable hybrid energy storage vehicle

Publicada en Tecnologías asociadas a almacenamiento de energía, 10/02/2022.

Solicitante: Hung Chang International Energy Co., Ltd.
An energy storage vehicle includes a solar cell, a power storage equipment, an engine, a transmission module, an electric motor, a pump, a hydraulic motor, a remote control module, and a generator. The transmission module includes an input terminal, a first output terminal, a first clutch, a second output terminal, and a second clutch. The input terminal of the transmission module is driven by the engine. The power storage equipment is configured to store the electrical energy generated by the solar cell and the generator.



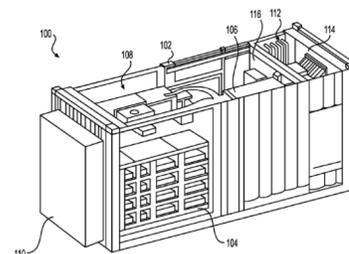
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Thermal management system for an energy storage container

Publicada en Tecnologías asociadas a almacenamiento de energía, 10/02/2022.

Solicitante: Caterpillar Inc.

A thermal management system for an energy storage container includes an enclosed compartment containing an energy storage unit, an air temperature control unit configured to cool an interior of the enclosed compartment, and at least one inverter connected to a coolant circuit, which is separate from the air temperature control unit, and configured to be cooled by a coolant in the coolant circuit.



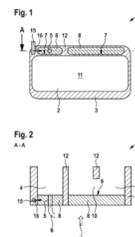
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Heat exchange module for an energy storage module, and a production method for such a heat exchange module

Publicada en Tecnologías asociadas a almacenamiento de energía, 09/02/2022.

Solicitante: PORSCHE AG

The invention relates to a heat exchange module 1 for an energy storage module, having a module housing 3 for heat-transferring contact with an energy storage Module, at least one operating medium channel 7 for an operating fluid for heat transport; and at least one fluid connection 5 for at least one external line for the operating fluid of the operating medium channel. The heat exchange module is characterized in particular in that there is formed by the at least one operating medium channel at least one receiving opening with a predetermined cross section in a channelward extension of the operating medium channel, in which a plug 8 with a shape filling the predetermined cross section of the receiving opening is received such that the receiving opening is bonded thereto in a fluid-tight manner.



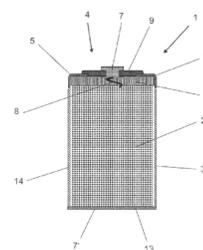
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Electrochemical energy storage cell

Publicada en Tecnologías asociadas a almacenamiento de energía, 03/02/2022.

Solicitante: Carl Freudenberg KG

An electrochemical energy storage cell includes: a housing; and at least one cell coil accommodated in the housing. The housing is closed at at least one end face by a cover. The cover forms a part of the housing. At least one insulation element is arranged between the at least one cell coil and the housing. The at least one insulation element is made of an electrically insulating and thermally conductive material.



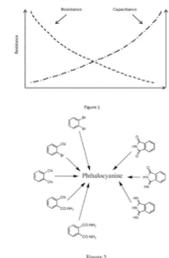
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Electrodes and currents through the use of organic and organometallic high dielectric constant materials in energy storage devices and associated methods

Publicada en Tecnologías asociadas a almacenamiento de energía, 03/02/2022.

Solicitante: Cleanvolt Energy, Inc.

Improved electrodes and currents through the use of organic and organometallic high dielectric constant materials containing dispersed conductive particles in energy storage devices and associated methods are disclosed.



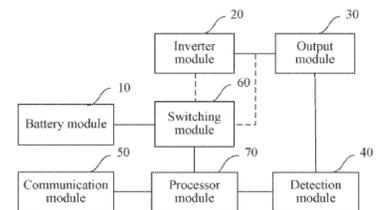
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Energy storage power supply, parallel control device for energy storage power supplies, and parallel control method for energy storage power supplies

Publicada en Tecnologías asociadas a almacenamiento de energía, 03/02/2022.

Solicitante: SHENZHEN HELLO TECH ENERGY CO LTD

Provided are an energy storage power supply, a parallel control device for energy storage power supplies and a parallel control method for energy storage power supplies. The energy storage power supply includes a battery module; an inverter module electrically connected to the battery module; an output module electrically connected to the inverter module; an detection module electrically connected to the output module; an communication module communicated with another energy storage power supply; an switching module electrically connected to the inverter module or the output module



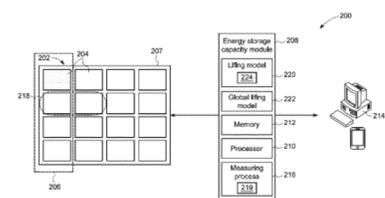
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Energy storage rolling capacity check including in-situ life model comparison

Publicada en Tecnologías asociadas a almacenamiento de energía, 03/02/2022.

Solicitante: GENERAL ELECTRIC COMPANY

According to some embodiments, system and methods are provided comprising providing an energy storage device including two or more energy storage elements; initiating execution of an energy storage capacity module operative to test a capacity of a first energy storage element; removing the storage element from service, while maintaining service of the energy storage device; measuring a capacity of the removed storage element; receiving the measured capacity at a lifing model; executing the lifing model to generate an output; and manipulating operation of the energy storage device based on the generated output. Numerous other aspects are provided.



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Gravity-based energy storage system

Publicada en Tecnologías asociadas a almacenamiento de energía, 03/02/2022.

Solicitante: Gravitricity Ltd

An energy storage system and method that enables gravity-based energy storage to have a significantly larger capacity in a single shaft for given capital cost and thus an improved cost per unit energy for large scale energy storage as well as enabling continuity of power input and output at an external connection point across the extent of the system's energy capacity



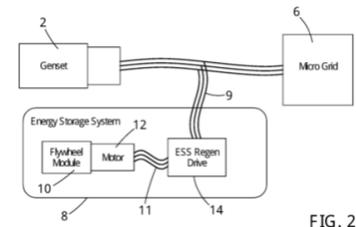
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Power generation control with an energy storage system

Publicada en Tecnologías asociadas a almacenamiento de energía, 03/02/2022.

Solicitante: PUNCH FLYBRID LIMITED [GB]

An AC generating system having a power source, a controller, and an energy storage subsystem including a rotatable flywheel connected to an electrical machine which is operable to convert flywheel rotation into electrical energy and vice versa, the controller being arranged to cause the energy storage subsystem to transfer energy from or to the generating system via the electrical machine, to maintain a target state of charge of the flywheel.



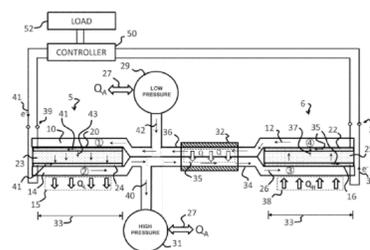
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Thermo-electrochemical convertor with integrated energy storage

Publicada en Tecnologías asociadas a almacenamiento de energía, 03/02/2022.

Solicitante: Johnson IP Holding, LLC

An electrochemical direct heat to electricity converter includes a primary thermal energy source; a working fluid; an electrochemical cell comprising at least one membrane electrode assembly including a first porous electrode, a second porous electrode and at least one membrane, wherein the at least one membrane is sandwiched between the first and second porous electrodes and is a conductor of ions of the working fluid; an energy storage reservoir



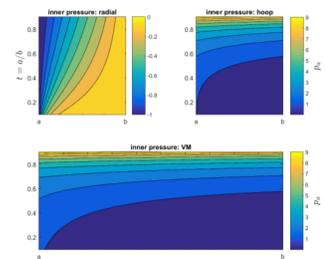
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Analysis and optimization of a novel energy storage flywheel for improved energy capacity

Publicada en <https://arxiv.org>, 20/02/2022.

Kinetic/Flywheel energy storage systems (FESS) have re-emerged as a vital technology in many areas such as smart grid, renewable energy, electric vehicle, and high-power applications. FESSs are designed and optimized to have higher energy per mass (specific energy) and volume (energy density). Prior research, such as the use of high-strength materials and the reduction of stress concentration, primarily focused on designing and optimizing the rotor itself



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Multi-stage dynamic optimal allocation for battery energy storage system in distribution networks with photovoltaic system

Publicada en BASE Bielefeld Energy Storage, 09/02/2022.

In this article, a multi-stage optimal allocation method for battery energy storage system (BESS) in distribution networks with photovoltaic (PV) system is proposed, which is to obtain its optimal installation location, capacity, power, and investment time. This method takes the time value of money, the PV growth rate, and the load increase during the investment period into consideration. Firstly, genetic algorithm and gravity search algorithm are combined to solve a single-stage static optimal [...]

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Optimal Stochastic Deployment of Heterogeneous Energy Storage in a Residential Multi-Energy Microgrid with Demand-Side Management

Publicada en BASE Bielefeld Energy Storage, 09/02/2022.

The optimal deployment of heterogeneous energy storage (HES), which mainly consists of electrical and thermal energy storage, is essential for increasing the holistic energy utilization efficiency of multi-energy systems. Consequently, this paper proposes a risk-averse method for HES deployment in a residential multi-energy microgrid (RMEMG), considering the diverse uncertainties and multi-energy demand-side management (DSM). Apart from the HES size, location planning, its optimal investment pha[...]

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Battery Energy Storage Systems Allocation Considering Distribution Network Congestion

Publicada en BASE Bielefeld Energy Storage, 09/02/2022.

This paper proposes an operational planning strategy for battery energy storage systems (BESS) in medium voltage distribution networks. This strategy determines the optimal location and size for BESS as well as the discharging and charging schedules. The objective of this methodology is to improve reliability and stability by relieving distribution network congestion, such as voltage violations and lines overloading. Particle Swarm, Firefly, Novel Bat, Krill herd and Coyote optimization algorithm[...]

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Developing a framework for a retail electricity model incorporating energy storage

Publicada en BASE Bielefeld Energy Storage, 09/02/2022.

Embedded generation at the distribution level is an untapped source of voltage, frequency regulation and inertia services for the most part. The distribution level has historically been associated with the delivery of energy sourced from the transmission system via a wholesale electricity market. Due to the growth of embedded generation at the distribution level this flow is changing as solar and wind generation, electric vehicles, heat pumps and demand response activity via smart appliances and[...]

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Real-Time Model Predictive Control of Battery Energy Storage Active and Reactive Power to Support the Distribution Network Operation

Publicada en BASE Bielefeld Energy Storage, 09/02/2022.

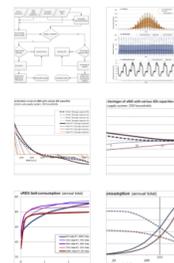
This paper proposes a model predictive control technique to optimally dispatch of battery energy storage systems (BESS) installed on the medium voltage distribution network to manage the violations in addition to enhancing the power quality and stability. A two-phase strategy is developed to manage the BESS inverter power on the four active/reactive power quadrants. A multiobjective function is formulated in order to optimize the system voltage, power factor and line losses. The uncertainties as[...]

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Balancing responsibilities: Effects of growth of variable renewable energy, storage, and undue grid interaction

Publicada en BASE Bielefeldt Energy Storage, 09/02/2022.

Electrical energy storage is often proposed as a solution for the mismatch between supply patterns of variable renewable electricity sources and electricity demand patterns. However, effectiveness and usefulness of storage may vary under different circumstances. This study provides an abstract perspective on the merits of electrical energy storage integrated with decentralized supply systems consisting of solar PV and wind power in a mesolevel, residential sector context. We used a balancing mod[...]

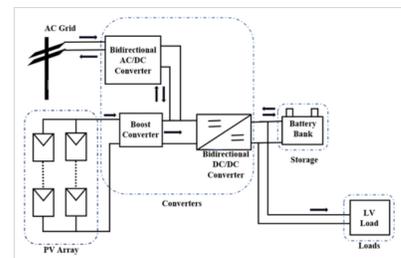


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Power conversion in a gridconnected residential PV system with energy storage using fuzzylogic controls

Publicada en BASE Bielefeldt Energy Storage, 09/02/2022.

Increasing implementations of renewable energy resources to migrate from fossil fuel based electric power to clean energies have been creating new technical challenges due to their integration into an existing electrical grid. In this research, a power electronic converter based on fuzzy-logic controller is developed to govern the transfer and control of power in a grid-connected residential photovoltaic (PV) system with battery storage. A bidirectional dc-dc converter is designed for power tran[...]

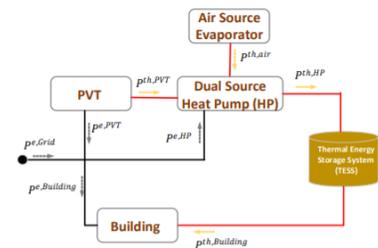


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Uncertainty-Cognizant Model Predictive Control for Energy Management of Residential Buildings with PVT and Thermal Energy Storage

Publicada en <https://arxiv.org>, 21/01/2022.

The building sector accounts for almost 40 percent of the global energy consumption. This reveals a great opportunity to exploit renewable energy resources in buildings to achieve the climate target. In this context, this paper offers a building energy system embracing a heat pump, a thermal energy storage system along with grid-connected photovoltaic thermal (PVT) collectors to supply both electric and thermal energy demands of the building with minimum operating cost.

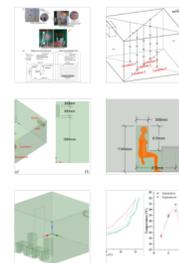


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Indoor thermal environment in a rural dwelling heated by air-source heat pump air-conditioner

Publicada en Sustainable Energy Technologies and Assessments, 15/01/2022.

Publication date: June 2022 Source: Sustainable Energy Technologies and Assessments, Volume 51 Author(s): Shengyuan Ma, Wei Liu, Jiankai Dong, Jing Liu, Zhaojun Wang. Air-source heat pumps (ASHP) are increasingly used to improve space heating. However, few relevant studies have focused on the rural residential buildings that use ASHP air-conditioners for heating conditions. Therefore, this paper presents experiments and numerical simulations to analyse the impact of ASHP air-conditioners on the indoor thermal environment of a rural dwelling during heating seasons.

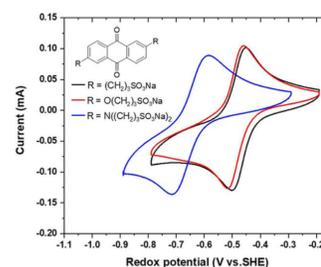


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Highly Stable Low Redox Potential Quinone for Aqueous Flow Batteries

Publicada en Wiley: Batteries & Supercaps, 14/01/2022.

Batteries & Supercaps, Accepted Article. Organic negolyte electrolyte for flow batteries: Three anthraquinones with C, N, O- linked water-soluble chains have been synthesized and evaluated for aqueous flow batteries. The nitrogen linked anthraquinone showed the lowest redox potential of 0.62V vs. SHE. Paired with ferrocyanide, it formed a cell voltage of 1.14V with a capacity fade rate of 0.025%/day at pH=14.

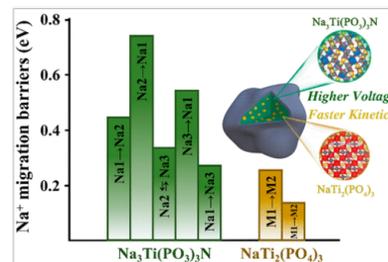


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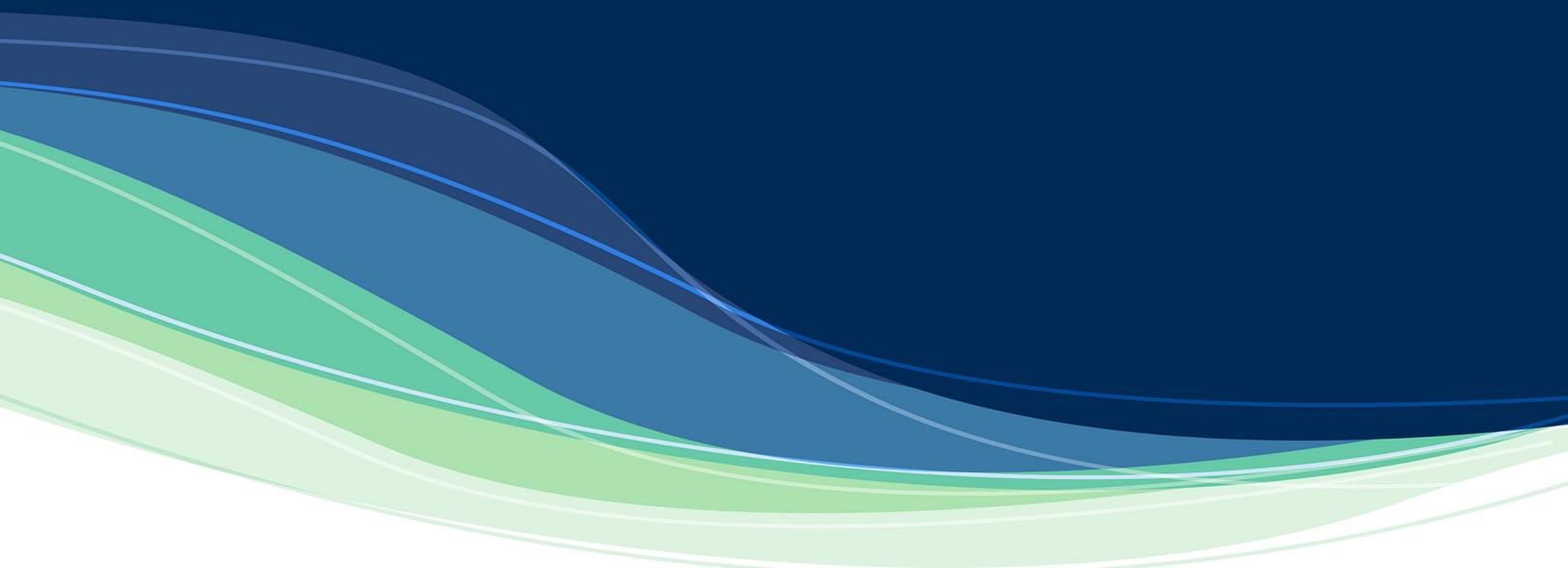
In Situ Secondary Phase Modified Low-Strain Na₃Ti(PO₃)₃N Cathode Achieving Fast Kinetics and Ultralong Cycle Life

Publicada en ACS Energy Letters, 14/01/2022.

ACS Energy Letters DOI: 10.1021/acseenergylett.1c02361. Titanium-based polyanionic materials have attracted extensive studies in recent decades due to their prominent advantages of outstanding structural stability and low cost, which make them promising electrode materials in sodium-ion batteries (SIBs). However, their electrochemical performance is usually limited by an inherently low electronic conductivity.



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