BOLETÍN DE VIGILANCIA TECNOLÓGICA E INTELIGENCIA COMPETITIVA

ALMACENAMIENTO DE ENERGÍA

JULIO - AGOSTO 2021

BATTERYPLAT

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NOTICIAS

DOE-backed battery technology promises much faster charging than lithium-ion devices

Publicada en https://www.utilitydive.com, 31/08/2021.

An energy storage technology developed with backing from the Department of Energy (DOE) could reduce charging time to a matter of minutes compared to lithium-ion batteries, according to research published in the journal Advanced Functional Materials.

ver más...

American Clean Power Association to further expand with U.S. Energy Storage Association merger

Publicada en altenergymag, 23/08/2021.

The American Clean Power Association (ACP) and the U.S. Energy Storage Association (ESA) today announced that ESA’s member companies approved the merger to join ACP effective January 1, 2022. The American Clean Power Association (ACP) and the U.S. Energy Storage Association (ESA) today announced that ESA's member companies approved the merger to join ACP effective January 1, 2022.

ver más...

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Electric vehicles: recycled batteries and the search for a circular economy

Publicada en https://silanano.com/, 03/08/2021.

The explosion in demand for EVs has spurred a quest for alternative sources of key metals such as cobalt and nickel
Few people have had the sort of front-row seat to the rise of electric vehicles as JB Straubel. The softly spoken engineer is often considered the brains behind Tesla: it was Straubel who convinced Elon Musk, over lunch in 2003, that electric vehicles had a future.

ver más...

La CE contempla una categoría específica de baterías de vehículos ligeros para garantizar su reciclado

Publicada en https://www.residuosprofesional.com, 28/07/2021.

Un informe del Centro Común de Investigación de la Comisión Europea recomienda la definición de una quinta categoría de baterías para medios ligeros como bicicletas o patinetes eléctricos, y la creación de un canal de devolución específico que incluya a las tiendas de deportes y otros distribuidores. También propone definir objetivos de recogida basados en los residuos disponibles, y no en los productos comercializados.

ver más...

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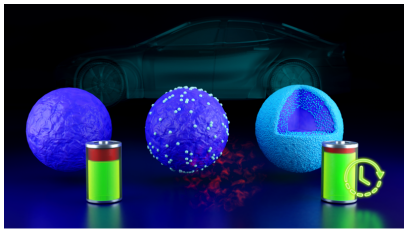
‘Founding Father’ of lithium-ion batteries helps solve 40-year problem with his invention

Publicada en https://neutrons.ornl.gov, 27/07/2021.

In the late 1970s, M. Stanley Whittingham was the first to describe the concept of rechargeable lithium-ion batteries, an achievement for which he would share the 2019 Nobel Prize in Chemistry. Yet even he couldn’t have anticipated the complex materials science challenges that would arise as these batteries came to power the world’s portable electronics.



ver más...

Un avance crucial para las baterías de metal de litio gracias a las tiras de litio de 20 micrones

Publicada en https://www.hibridosyelectricos.com, 10/07/2021.

Una investigación llevada a cabo gracias al Consorcio Battery500 ha logrado aumentar la vida útil de las baterías de metal de litio hasta los 600 ciclos de carga y descarga, gracias al empleo en el ánodo de tiras de litio de 20 micrones de ancho, más delgadas que un cabello humano.

ver más...

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Innovative Concrete-Based Battery Could Let Buildings Store Energy

Publicada en https://www.intelligentliving.co, 02/07/2021.

Scientists in Sweden conducted battery research that focused on making batteries store energy and double as structural components for buildings. The team demonstrated a novel cement-based battery that could see large structures built from functional concrete. The research was executed at the Chalmers University of Technology, where scientists were developing more sustainable building materials, focusing on concrete, the world's most widely-used, energy-intensive material.

ver más...

Pumped hydro plant operator applies for 600MW expansion project in Scotland

Publicada en https://www.energy-storage.news, 01/07/2021.

UK power generation company Drax has announced plans for a new underground pumped hydro storage power station, and will seek planning permission to expand its Cruachan site in Scotland to 1.04GW.The 600MW power station will be built inside Argyll's highest mountain Ben Cruachan, alongside the company's existing 440MW pumped storage hydro station dubbed the Hollow Mountain. The two will share the existing upper reservoir, as it has enough capacity for both at 2.4 billion gallons of water.

ver más...

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EMPRESAS Y MERCADOS

Rhombus Energy Solutions Announces the General Availability of its Breakthrough Serial Switching DC Fast Charger Dispenser

Publicada en altenergymag, 27/08/2021.

New solution supports up to five remote dispensers per charger, all on the same DC power feed, with full bi-directional capability. Today, Rhombus Energy Solutions is announcing the launch and general availability of the RES-D3-CS20 DC fast charger dispenser for electric vehicles (EVs).

ver más...

Sunverge Announces Strategic Partnership with Simply Energy, Nissan Australia and Wallbox to Deliver Electric Vehicle-to-Home and Electric Vehicle-to-Grid Services

Publicada en altenergymag, 25/08/2021.

Integrated solution will provide an advanced electric vehicle to home (V2H) capability with intelligent, dynamic and grid-aware energy management of Australia's growing fleet of electric vehicles, allowing for holistic real-time flexible multi-asset load management, co-optimized with multi-service VPP offering that now includes EVs, enhanced resiliency and backup power.

ver más...

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Energy Vault Announces $100 Million Series C Funding

Publicada en altenergymag, 25/08/2021.

New Financing from Round Led by Prime Movers Lab Will Support Deployment of EVx™ Platform to Fulfill Strong Pipeline of Customer Demand. Energy Vault (the "Company"), the creator of gravity-based, grid-scale energy storage solutions with its proprietary technology, today announced $100 million in Series C funding.

ver más...

DGC Scales Sustainable Infrastructure Efforts, Nexamp Secures $680 Million Investment Towards Clean Energy

Publicada en altenergymag, 25/08/2021.

DGC furthers environmental sustainability efforts by diversifying its strategic portfolio in clean energy. Diamond Generating Corporation (DGC), a worldwide leader in safe, clean electricity generation and energy services, strengthens its strategic portfolio while accelerating decarbonization efforts, following a $240 million equity investment in DGC subsidiary Nexamp by Generate Capital, Inc.

ver más...

Kokam Supplies Battery Energy Storage System to Electricité De Tahiti: Virtual Synchronous Generator to Help Decarbonize Electricity Generation

Publicada en altenergymag, 23/08/2021.

Kokam's Lithium-ion NMC battery technology cost-effectively provides high-power output to replace the network's spinning reserve diesel generators. Kokam Co., Ltd, a global provider of innovative lithium-ion battery solutions and a subsidiary of SolarEdge Technologies, has entered into contract to supply Electricité de Tahiti (EDT), a subsidiary of ENGIE, with a Battery Energy Storage System (BESS) serving as Tahiti's first 'Virtual Synchronous Generator (VSG)'.

ver más...

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Hitting the Books: How Tesla engineers solved the problem of exploding EV batteries

Publicada en https://www.engadget.com, 21/08/2021.

Between CEO Elon Musk's often erratic antics, strident competition from existing industry titans, and a public that is still not fully sold on the idea of traveling via electrical charge, Tesla's road to prominence has not been a smooth one. But facing a federal investigation into its driver assist systems, is far from the biggest roadblock the company has navigated.

ver más...

E.ON partners with Vestel to expand its EV charger portfolio

Publicada en altenergymag, 20/08/2021.

The new partnership will see E.ON build upon its European portfolio of EV chargers with user-friendly models from multi-sector technology company, Vestel. As a first step, the Vestel-designed EV chargers are being initially rolled out to Germany.

ver más...

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UK renewable energy entrepreneur’s new battery storage venture secures 160MW project pipeline

Publicada en https://www.energy-storage.news, 18/08/2021.

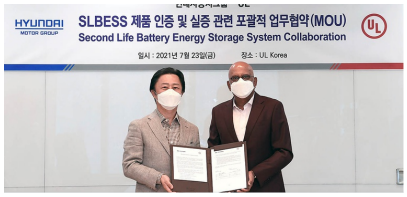
Amit Gudka co-founded energy retailer Bulb in 2014, leaving to launch Field at the beginning of this year. Battery storage startup Field has secured a pipeline of 160MW of battery storage sites in the UK, and begun construction of its first 20MW site in Oldham, England.

ver más...

UL, Hyundai to partner on evaluation of EV batteries for energy storage

Publicada en https://www.utilitydive.com, 18/08/2021.

Safety science company UL is partnering with Hyundai Motor Company on a project to explore the safe deployment of used electric vehicle batteries for stationary energy storage.



ver más...

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Wärtsilä to deliver another 200MWh of battery storage for Pivot Power's UK 'Energy Superhubs'

Publicada en https://www.energy-storage.news, 21/07/2021.

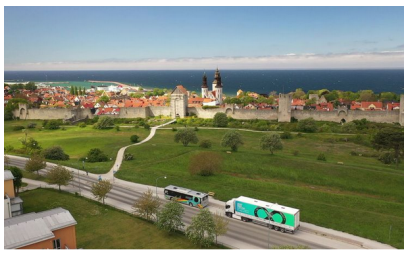
Work in progress at one of Pivot Power's UK 'Energy Superhubs'. Image: Pivot Power.

UK-based energy storage investor-developer Pivot Power is to develop 100MW / 200MWh of battery storage split across two sites in the West Midlands region of England in partnership with energy technology provider Wärtsilä.

ver más...

Israeli Startup Sees Electricity Paving Road to the Future

Publicada en https://www.bloomberg.com, 06/07/2021.



Oren Ezer insists that the road to the electric-vehicle future will be paved with ... well ... asphalt, just like today's highways. But beneath the surface, Ezer says, will be conductive coils that can wirelessly charge battery-powered cars, buses, and trucks, offering a fix for the biggest hurdle in the emerging EV industry: range anxiety. ElectReon Wireless Ltd., the company Ezer co-founded in 2013, has lined 6 kilometers of roads in Israel and Sweden to prove the viability of the idea, and it's working on similar projects in Germany and Italy.

ver más...

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Envision Group has joined the race to build the UK’s first lithium-ion gigafactory

Publicada en https://www.bestmag.co.uk, 01/07/2021.

Envision Group has joined the race to build the UK’s first lithium-ion gigafactory that will form part of a £1 billion ($1.3 billion) electric vehicle hub. The company will invest £450 million ($622 million) to build the gigafactory on the International Advanced Manufacturing Park (IAMP).

ver más...

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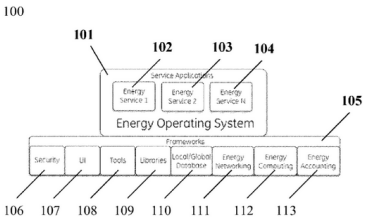
PATENTES

Adaptive energy storage operating system for multiple economic services

Publicada en Tecnologías asociadas a almacenamiento de energía, 26/08/2021.

Solicitante: Growing Energy Labs, Inc.
The present disclosure provides an adaptive energy storage operating system that is programmed or otherwise configured to operate and optimize various types of energy storage devices.

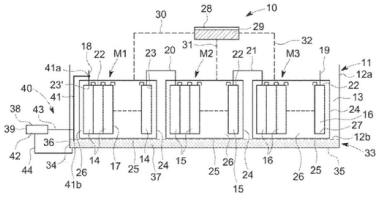


ver más...

Battery system, method for leakage detection inside the battery system, and vehicle including the battery system

Publicada en Tecnologías asociadas a baterias para transporte, 26/08/2021.

Solicitante: SAMSUNG SDI CO., LTD.
A battery system, a method of detecting leaks inside a battery system, and a vehicle, the battery system including a housing including a housing frame and a base frame, the housing frame and the base frame enclosing a housing space; a battery module including a plurality of battery cells electrically connected to each other via a bus bar, the battery module being in the housing space; a tray including a tray frame and a tray base; and a battery management system including a liquid detector, wherein the liquid detector is configured to detect a liquid inside the tray, and the liquid detector includes a high-voltage conductor, a first end of the high-voltage conductor being connected to the bus bar and a second end of the high-voltage conductor being between the base frame and the tray base.



ver más...

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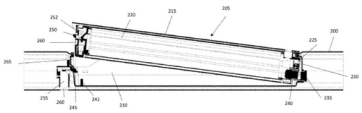
Bicycle battery storage system

Publicada en Tecnologías asociadas a baterias, supercapacitadores, supercondensadores, acumuladores, 26/08/2021.

Solicitante: Trek Bicycle Corporation



A bicycle battery system includes a battery tray that mounts within a cavity formed by an opening in a bicycle tube. The battery tray includes a latch mechanism, a first base portion that mounts to the latch mechanism, and a second base portion that mounts to the first base portion. The first base portion includes a cup that is sized to mate with an interior of the bicycle tube. The system also includes a battery that is sized to fit within the battery tray. A first end of the battery includes a protrusion that is sized to fit within the cup of the first base portion, and a second end of the battery includes a secondary latch to secure the second end to the battery tray.

ver más...

Control method and apparatus for coordinated participation of photovoltaic power generation and energy storage in primary frequency regulation of power grid

Publicada en Tecnologías asociadas a almacenamiento de energía, 26/08/2021.

Solicitante: CHINA ELECTRIC POWER RESEARCH INSTITUTE COMPANY LIMITED

A control method and apparatus for the coordinated participation of photovoltaic power generation and energy storage in the primary frequency regulation of a power grid, the control method for the coordinated participation of photovoltaic power generation and energy storage in the primary frequency regulation of the power grid comprising: determining an active power adjustment amount required by a photovoltaic power station that comprises a centralized energy storage system to participate in the primary frequency regulation of a power grid (S101); on the basis of the active power adjustment amount required by the photovoltaic power station to participate in the primary frequency regulation of the power grid, correcting an active power reference value of the photovoltaic power station (S102); and on the basis of the corrected active power reference value of the photovoltaic power station, adjusting respective active power of a photovoltaic power generation system and the centralized energy storage system separately

ver más...

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Energy storage systems and methods for energy storage systems

Publicada en Tecnologías asociadas a almacenamiento de energía, 26/08/2021.

Solicitante: GENERAL ELECTRIC COMPANY [US]
An energy storage system includes a stack including a plurality of energy storage modules and a panel assembly enclosing at least two sides of the stack. The panel assembly includes a plurality of structurally insulated panels. Each of the structurally insulated panels includes a first frame, a second frame, and a thermal insulation body coupled to, and extending between, the first frame and the second frame.

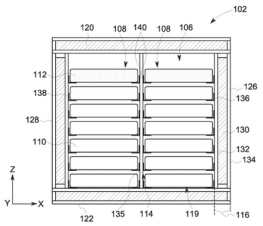


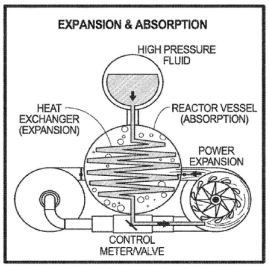
FIG. 2

ver más...

Mechanical-chemical energy storage

Publicada en Tecnologías asociadas a almacenamiento de energía, 26/08/2021.

Solicitante: EOS Energy Storage, LLC
This invention generally relates to mechanical-chemical energy storage. In particular, the invention relates to a mechanical-chemical energy storage system that stores energy by simultaneously compressing a gas to a higher enthalpy state and recovering the heat of compression by driving a somewhat reversible chemical reaction. The heat energy in the chemical reaction is then recovered while the gas is expanding to a lower enthalpy state.



ver más...

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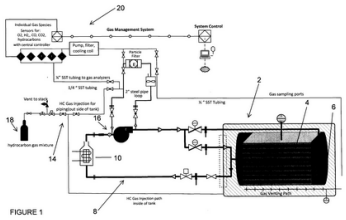
Modified inert gas atmosphere and graphite based thermal energy storage

Publicada en Tecnologías asociadas a almacenamiento de energía, 26/08/2021.

Solicitante: KELVIN THERMAL ENERGY INC. [CA]
In graphite based thermal storage units capable of operating at high temperatures, it is advantageous to have an inert nitrogen based atmosphere. Such large storage systems can be heated to temperatures in excess of 1500° C. using embedded graphite based electrical heating elements. In order to reduce possible loss of graphite, particularly from heating elements, small amounts of hydrocarbon gas is added. The preferred gas is ethylene.



ver más...

Modular Ultracapacitor Energy Storage/Power Delivery Apparatus and Methods

Publicada en Tecnologías asociadas a almacenamiento de energía, 26/08/2021.

A modular integrated ultracapacitor-based energy storage and power delivery apparatus (UCAP module) is described. In some embodiments, the UCAP module comprises: at least one ultracapacitor cell coupled together in a series, parallel, or combination of both series and parallel configuration; an integrated charging unit; conductive hardware electrically coupling the ultracapacitors cells together; at least one UCAP terminal rod extending throughout the UCAP module and used to route power within the UCAP module and in some embodiments to other UCAP modules; and a protective casing. In some embodiments the UCAP terminal rod couples the UCAP module to at least one additional UCAP module in a series, parallel, or a combination of both series and parallel configurations. In other embodiments, the UCAP module further comprises connector rods that electrically and mechanically couple the UCAP module to at least one additional UCAP module.

ver más...

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Organic expander for lead storage battery

Publicada en Tecnologías asociadas a baterias, supercapacitadores, supercondensadores, acumuladores, 26/08/2021.

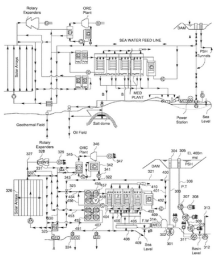
Solicitante: NIPPON PAPER INDUSTRIES CO., LTD.
An organic expander for a lead storage battery, the organic expander containing lignin in which the methoxy group content relative to the solid content is 3 to 20 mass %, wherein the organic expander contains an organic acid in an amount of 0.0001 to 5 mass % relative to the solid content of the organic expander. It is possible to improve charge acceptance while maintaining the discharge characteristics of the lead storage battery.

ver más...

Single-temperature-thermal-energy-storage

Publicada en Tecnologías asociadas a almacenamiento de energía, 26/08/2021.

Solicitante: JOHN D. WALKER
The various embodiments described herein include devices and systems for thermal energy storage. A single-temperature-thermal-energy storage (SITTES) system for desalinating seawater and/or producing electrical power is described. The SITTES system includes insulated tanks, a molten eutectic salt media arranged within the insulated tanks, heat exchangers arranged within the insulated tanks, and an outlet. In the SITTES system the heat exchangers are coupled to one another and configured to transfer heat between the salt media and a seawater media, and the outlet is configured to output a steam portion of the seawater media, thereby providing desalination of the portion of the seawater media and steam for electrical power generation.



ver más...

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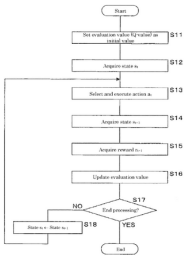
Action generator, energy storage device evaluator, computer program, learning method, and evaluation method

Publicada en Tecnologías asociadas a almacenamiento de energía, 19/08/2021.

Solicitante: GS Yuasa International Ltd.



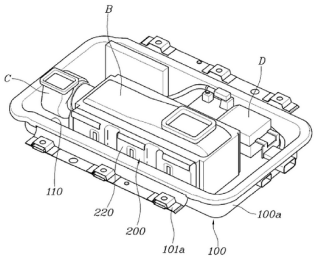
An action generator includes: an action selection unit that selects an action including setting related to a state of charge (SOC) of an energy storage device on the basis of action evaluation information; a state acquisition unit that acquires a state including a state of health (SOH) of the energy storage device when the action selected by the action selection unit is executed; a reward acquisition unit that acquires a reward in reinforcement learning when the action selected by the action selection unit is executed; an updating unit that updates the action evaluation information on the basis of the state acquired by the state acquisition unit and the reward acquired by the reward acquisition unit; and an action generation unit that generates an action corresponding to the state of the energy storage device on the basis of the action evaluation information updated by the updating unit.

ver más...

Battery storage device for electric vehicle

Publicada en Tecnologías asociadas a almacenamiento de energía, 19/08/2021.

Solicitantes: HYUNDAI MOTOR COMPANY; KIA MOTORS CORPORATION



A battery storage device for an electric vehicle includes a reinforcing panel that reduces impact energy and is disposed between a case and a battery module, whereby, when a car collision occurs, the battery module is protected from impact by the reinforcing panel, damage to the battery module is reduced, stability of the vehicle is secured, and manufacturing costs are reduced.

ver más...

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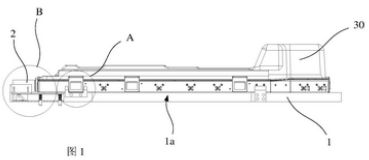
Charging compartment, charging frame comprising same, battery swap station, and energy storage station

Publicada en Tecnologías asociadas a almacenamiento de energía, 19/08/2021.

Solicitante: AULTON NEW ENERGY AUTOMOTIVE TECHNOLOGY GROUP [CN]



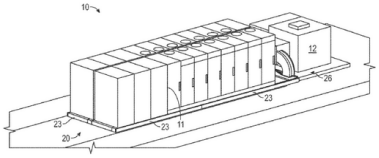
Disclosed are a charging compartment, a charging frame comprising same, a battery swap station and an energy storage station. The charging compartment (10) is configured such that a battery pack (30) is placed by a battery pack transfer device. The charging compartment (10) comprises: a carrying mechanism (1), the carrying mechanism (1) carrying the battery pack (30) by means of a frame structure, and the carrying mechanism (1) having a frameless space (1a) allowing an extension mechanism of the battery pack transfer device to enter when the battery pack transfer device places the battery pack (30) in the carrying mechanism (1)

ver más...

Chassis assembly for energy storage equipment

Publicada en Tecnologías asociadas a almacenamiento de energía, 19/08/2021.

Solicitante: Affordable Solar Installation, Inc.



Assemblies for supporting energy storage equipment, and more particularly, pre-fabricated, above-ground, affixed, ventilated or non-ventilated, power feeder chassis assemblies for large-scale electrical energy storage equipment, comprising a frame unit with certain features that make it capable of supporting energy storage equipment and a cable feeder with certain features that connect destination equipment to the electrical energy storage equipment. Various features of the assembly are described. Also described are methods of manufacturing the same, some of which are directed to methods of pre-fabrication, mass manufacture and transportability. Also described are methods of installing the same, some of which are directed to methods of laying out in grid patterns for large-scale projects.

ver más...

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Electrode, energy storage device and method

Publicada en Tecnologías asociadas a almacenamiento de energía, 19/08/2021.

Solicitante: INSTITUTT FOR ENERGITEKNIKK [NO]
Electrode for an energy storage device which comprises a powder of particles (26) comprising amorphous, micro- or nano-crystalline coated or uncoated silicon oxynitride having a chemical formula SiNxOy, where 0.03 x+y < 1.3, whereby nitrogen makes up 10-99% of said x+y value with the balance being oxygen.

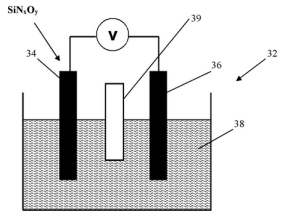


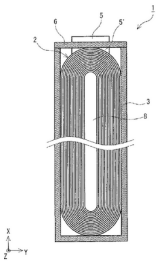
Fig. 3

ver más...

Energy storage device and method for manufacturing energy storage device

Publicada en Tecnologías asociadas a almacenamiento de energía, 19/08/2021.

Solicitante: GS Yuasa International Ltd.
An aspect of the present invention is an energy storage device including an electrode assembly that has a negative electrode and a positive electrode, where the negative electrode contains a negative electrode substrate and a negative active material, and has a negative active material layer disposed in an unpressed shape along at least one surface of the negative electrode substrate, the negative active material includes solid graphite particles as a main component, and the solid graphite particles have an aspect ratio of 1 or more and 5 or less.



ver más...

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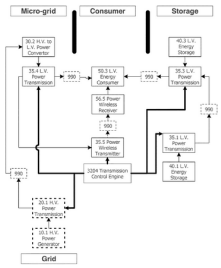
Feedforward Dynamic and Distributed Energy Storage System

Publicada en Tecnologías asociadas a almacenamiento de energía, 19/08/2021.

Solicitante: Michael Gurin
A system and method for energy distribution leveraging dynamic feedforward allocation of distributed energy storage using multiple energy distribution pathways to maximize load-balancing to accelerate return on investment, reduce system energy consumption, and maximize utilization of existing energy infrastructure particularly for modular construction.

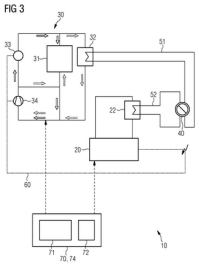


ver más...

Power plant with energy storage system

Publicada en Tecnologías asociadas a almacenamiento de energía, 19/08/2021.

Solicitante: SIEMENS GAMESA RENEWABLE ENERGY GMBH & CO. KG [DE]
A system is provided that comprises a combined heat and power (CHP) plant (20) that is operable to generate electrical power and to provide a source of heat, wherein the CHP plant (20) is configured to supply heat to a heat consumer (40). The system further includes an energy storage system (30) storing energy in the form of thermal energy, wherein the energy storage system (30) is configured to supply heat to said heat consumer (40). The energy storage system (30) comprises an energy storage device (31) configured to store thermal energy, and a heat exchanger (32) configured to supply heat towards said heat consumer (40).



ver más...

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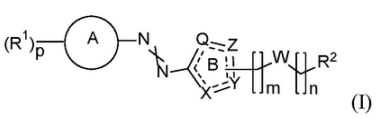
Arylazo-heteroaryl compounds and their use for long-term thermal energy storage

Publicada en Tecnologías asociadas a almacenamiento de energía, 12/08/2021.

Solicitantes: BRANDEIS UNIVERSITY [US]; IMPERIAL COLLEGE INNOVATIONS LIMITED [GB]; MASSACHUSETTS INSTITUTE OF TECHNOLOGY [US]



(I)

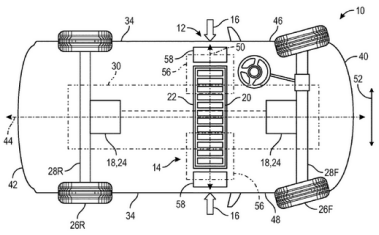
The present invention relates to a compound of Formula (I): wherein R1, R2, m, n, p, Q, X, Y, W, and "A" are as described herein. The present invention also relates to a process for preparation of a compound of Formula (I). Also disclosed is a thermal-storage device comprising one or more compounds of Formula (I) and a method of storing energy.

ver más...

Barrier assembly for an energy storage system and a vehicle that utilizes the barrier assembly

Publicada en Tecnologías asociadas a almacenamiento de energía, 12/08/2021.

Solicitante: GM GLOBAL TECHNOLOGY OPERATIONS LLC



A barrier assembly for an energy storage system includes a panel and an energy storage pack. The panel includes an outer surface and an inner surface opposing the outer surface. The energy storage pack is spaced from the panel relative to the inner surface of the panel. The barrier assembly further includes an intermediate structure disposed between the inner surface of the panel and the energy storage pack. The intermediate structure is configured to absorb energy when a load is applied to the outer surface of the panel and configured to redistribute the load along a plurality of load paths through the intermediate structure as the load is applied to the panel. A vehicle includes the barrier assembly discussed above.

ver más...

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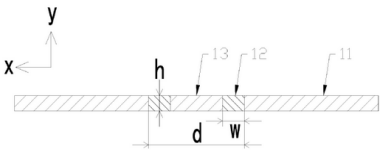
Explosion-proof enclosure for energy storage device and energy storage device

Publicada en Tecnologías asociadas a almacenamiento de energía, 12/08/2021.

Solicitante: ChangZhou Microbat Technology Co. Ltd.



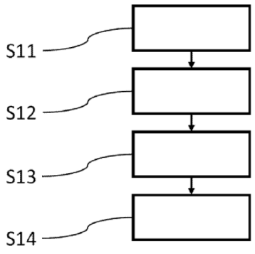
The present disclosure discloses an explosion-proof enclosure for an energy storage device and an energy storage device. The explosion-proof enclosure includes: a housing body, having a through hole; and an explosion-proof element, including a central portion and a pressure relief portion provided around the central portion, wherein the pressure relief portion is loop-shaped, the pressure relief portion is provided in the through hole and is in sealed connection with the through hole, the pressure relief portion is configured to crack and split from the housing body in response to the deformation of the housing body when the pressure intensity in the housing body reaches a first set value, and to detach from the housing body when the pressure intensity reaches a second set value, wherein the second set value is greater than the first set value.

ver más...

Method for ascertaining the state of charge of an electrical energy storage unit

Publicada en Tecnologías asociadas a almacenamiento de energía, 12/08/2021.

Solicitante: Robert Bosch GmbH



A method for ascertaining the state of charge of an electrical energy storage unit is described, said method comprising the steps of: a) ascertaining a voltage gradient at least based on a detected first voltage value of the electrical energy storage unit; b) comparing the ascertained voltage gradient with a predefined voltage gradient threshold value; c) ascertaining the state of charge of the electrical energy storage unit depending on the comparison. A corresponding computer program, a corresponding machine-readable storage medium, a corresponding apparatus and a corresponding electrical energy storage system are also described.

ver más...

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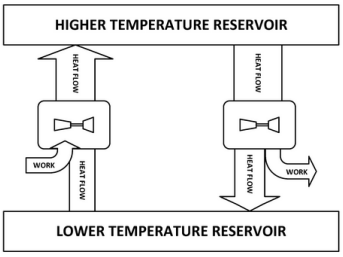
Reversible turbomachines in pumped heat energy storage systems

Publicada en Tecnologías asociadas a almacenamiento de energía, 12/08/2021.

Solicitante: MALTA INC. [US
Pumped heat energy storage systems and methods utilizing reversible turbomachines alternately acting as compressor and turbines to reversibly circulate working fluid through heat exchangers, including a hot-side heat exchanger and a cold-side heat exchanger.



ver más...

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A Novel Secondary Optimal Control for Multiple Battery Energy Storages in a DC Microgrid

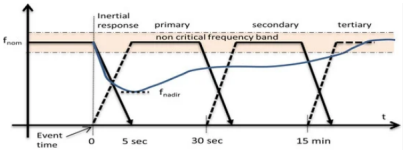
Publicada en BASE Bielefelt Energy Storage, 30/08/2021.

The distributed controller consisting of a voltage controller and a power controller is commonly employed on the secondary control layer in the DC microgrid. In this paper, a novel optimal control based on the PI consensus algorithm is proposed for multiple battery energy storages (BESs) in an islanded DC microgrid. Compared with the conventional distributed voltage controller, the proposed scheme improves the system robustness to time delays. The steady-state analysis is conducted to verify tha[...]

ver más...

Battery energy storage system for aggregated inertia-droop control and a novel frequency dependent state-of-charge recovery

Publicada en BASE Bielefelt Energy Storage, 30/08/2021.



To deal with the technical challenges of renewable energy penetration, this paper focuses on improving the grid voltage and frequency responses in a hybrid renewable energy source integrated power system following load and generation contingency events. A consolidated methodology is proposed to employ a battery energy storage system (BESS) to contribute to voltage regulation through droop-type control and frequency regulation by assimilated inertia emulation (IE) and droop-type control

ver más...

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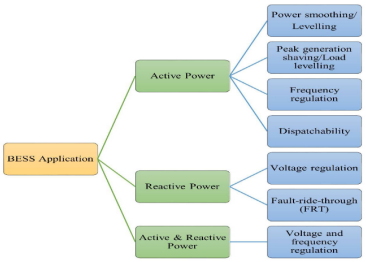
Thesis: Battery Energy Storage System for Renewable Energy Integrated Power System Stability Enhancement

Publicada en BASE Bielefelt Energy Storage, 30/08/2021.

With growing environmental concerns and sustainability movements, renewable energy source (RES) penetration is increasing and expected to have a steady growth in the coming years. Power systems have encountered several inherent technical challenges, resulting from either low inertia contribution by the increased RES or the displacement of fossil fuel generation systems within the network. The decreased system inertia and the decline in power reserve capacity are affecting the dynamic and transie[...]



ver más...

A Comparative Assessment of Battery Energy Storage Locations in Power Systems with High Wind Power Penetrations

Publicada en BASE Bielefelt Energy Storage, 26/08/2021.

Power systems operating at a high level of converter-based renewable generation impose significant challenges om power system frequency dynamics. Synchronous generator displacement reduces the overall system inertia and frequency response capability to disturbances. This research investigates the potential of energy storage to provide frequency service in lower inertia power systems. The impact of grid-scale battery energy storage locations on the system frequency nadir and the rate of change of[...]

ver más...

Volver al índice

System service provision capabilities of storage devices connected to a MV distribution network: A Northern Ireland case study

Publicada en BASE Bielefelt Energy Storage, 26/08/2021.

Investigation of ancillary service provision capabilities of storage devices is an important area of research in the context of smart grids. This paper presents the preliminary results of a case study conducted in collaboration with Northern Ireland's distribution network operator for exploring system service provision capabilities of storage devices. Using PMU data from a local substation, the study first identifies potential voltage and/or line loading violations owing to injections from plann[...]

ver más...

Techno-economic-environmental evaluation framework for integrated gas and electricity distribution networks considering impact of different storage configurations

Publicada en BASE Bielefelt Energy Storage, 26/08/2021.

This paper presents an evaluation framework for Techno-Economic-Environmental (TEE) performance of the Integrated Gas and Electricity Distribution Networks (IGEDNs). The proposed framework is based on a coupled gas and electric load flow model, facilitating the consideration of all the parameters affecting the operation of IGEDNs, such as different gas mixtures, gas temperature, pipeline characteristics and the electricity network topology. This framework can assess the impact of different stora[...]

ver más...

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A review on energy storage and demand side management solutions in smart energy islands

Publicada en BASE Bielefelt Energy Storage, 25/08/2021.

European Union has definitely identified the priorities towards sustainable and low-carbon energy systems recognizing a key role to islands that have been described as ideal sites to develop and test innovative strategies and solutions that will then boost the transition on the mainland. Nevertheless, the integration of Variable Renewable Energy Sources (vRES) into the electricity grid are already causing technical problems to island grids thus making grid flexibility a key topic. In the past, s[...]

ver más...

Preliminary design and performance assessment of an underwater compressed air energy storage system for wind power balancing

Publicada en BASE Bielefelt Energy Storage, 25/08/2021.

A key approach to large renewable power management is based on implementing storage technologies, including batteries, power-to-gas, and compressed air energy storage (CAES). This work presents the preliminary design and performance assessment of an innovative type of CAES, based on underwater compressed air energy storage (UW-CAES) volumes and intended for installation in the proximity of deep-water seas or lakes. The UW-CAES works with constant hydrostatic pressure storage and variable volumes[...]

ver más...

Volver al índice

Storage efficiency of paraffin-LDPE-MWCNT phase change material for industrial building applications

Publicada en BASE Bielefelt Energy Storage, 25/08/2021.

International audience ; Passive latent energy storage technologies with Phase Change Materials (PCM) provide a potential solution to reduce energy demand and regulate thermal comfort in occupied buildings. However, leakage of liquid PCM and low thermal conductivity limit the PCM building applications. In this context, the objective of this study is to develop a new shape stable PCM enhanced by carbon-based nanoparticles. The paraffin, Low-Density Polythene (LDPE) and Multi-Walled Carbon Nano-Tu[...]

ver más...

Residential solar power profitability with thermal energy storage and carbon-corrected electricity prices

Publicada en BASE Bielefelt Energy Storage, 25/08/2021.

We study the economic profitability of residential solar photovoltaic (PV) systems in Finland. We show a moderate rate of returns (1.0% in Northern and 1.4% in Southern Finland) for the PV system investments with time-of-use hot water heating. Optimized hot water heating increases the rate of return by 0.6 percentage points. We internalize the negative externalities of greenhouse gas emissions from electricity generation by presenting the hourly electricity prices as a function of emission permi[...]

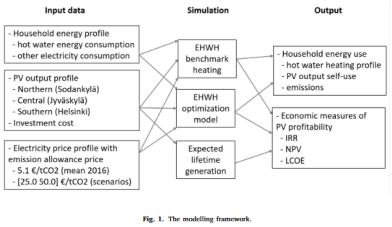

Fig. 1. The modelling framework.

ver más...

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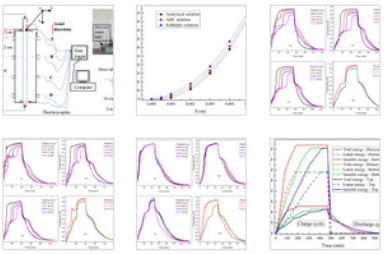
Thermal and energetic behaviour of solid-solid-liquid phase change materials storage unit: Experimental and numerical comparative study of the top, bottom and horizontal configurations

Publicada en BASE Bielefelt Energy Storage, 25/08/2021.

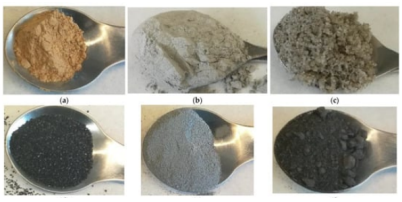


International audience ; Thermal energy storage technology with Phase Change Materials (PCM) is an attractive option to optimise energy resources and to recover and promote excess heat. The phase change behaviour of PCM requires advanced research to understand and better control the thermal energy storage using PCM, which is a crucial step to develop a powerful latent storage system. This paper aims to analyse the multiphysics phenomena of three regenerator configurations, horizontal case and tw[...]

ver más...

Characterization of Supplementary Cementitious Materials and Fibers to be Implemented in High Temperature Concretes for Thermal Energy Storage (TES) Application

Publicada en BASE Bielefelt Energy Storage, 24/08/2021.



Six supplementary cementitious materials (SCMs) were identified to be incorporated in concrete exposed to high-temperature cycling conditions within the thermal energy storage literature. The selected SCMs are bauxite, chamotte, ground granulated blast furnace slag, iron silicate, silica fume, and steel slag. A microstructural characterization was carried out through an optical microscope, X-ray diffraction analysis, and FT-IR. Also, a pozzolanic test was performed to study the reaction of SCMs [...]

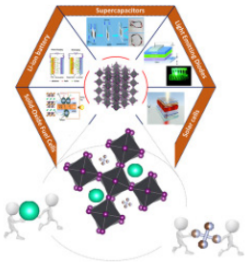
ver más...

Volver al índice

Perovskite materials as superior and powerful platforms for energy conversion and storage applications

Publicada en BASE Bielefelt Energy Storage, 23/08/2021.

In order to meet the continuously growing demand for clean energy, a plethora of advanced materials have been exploited for energy storage applications. Among these materials, perovskites belong to a relatively new family of compounds with the structural formula of ABX 3 . These compounds exhibit a variety of electrical, optical, and electronic properties to adopt them for a variety of energy conversion and storage applications. The present review highlights the multifaceted nature of perovskite[...]

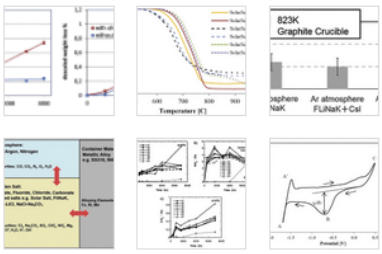


ver más...

Review of the solubility, monitoring, and purification of impurities in molten salts for energy storage in concentrated solar power plants

Publicada en BASE Bielefelt Energy Storage, 23/08/2021.

Thermal Energy Storage (TES) for Concentrated Solar Power (CSP) applications is a vital part of bringing green technologies to cost parity with traditional fuel-based power. Eutectic salt mixtures are highly suitable for use in TES. However, they contain impurities that can detrimentally impact their performance and corrosion characteristics when stored in a metallic container. This review will present a summary of findings that delve into the characterization, quantification, and, most importan[...]



ver más...

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Towards net-zero energy neighbourhoods utilising high rates of residential photovoltaics with battery storage: a techno-economic analysis

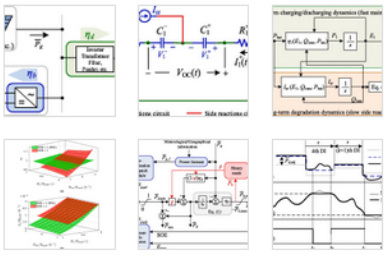
Publicada en BASE Bielefelt Energy Storage, 23/08/2021.

This paper aims to evaluate the role of residential battery storage in addressing network barriers to the further adoption of household photovoltaics, by presenting a unique perspective combining a housing and network techno-economic evaluation. Stochasticity in demand and weather inputs are modelled using Monte Carlo and a power flow model is constructed of a test area of the low-voltage (LV) network. Findings include: that batteries address voltage drop issues on LV networks at photovoltaic pe[...]

ver más...

Design of minimum cost degradation-conscious lithium-ion battery energy storage system to achieve renewable power dispatchability

Publicada en BASE Bielefelt Energy Storage, 23/08/2021.



The application of lithium-ion (Li-ion) battery energy storage system (BESS) to achieve the dispatchability of a renewable power plant is examined. By taking into consideration the effects of battery cell degradation evaluated using electrochemical principles, a power flow model (PFM) of the BESS is developed specifically for use in system-level study. The PFM allows the long-term performance and lifetime of the battery be predicted as when the BESS is undertaking the power dispatch control task[...]

ver más...

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Synergistic interface and mesopore engineering with more and quicker ion storage for enhanced performance of lithiumion battery

Publicada en Wiley: Batteries & Supercaps, 22/08/2021.

Design hetero-nanostructures are widely recognized as an effective modification strategy of ZnO/Co3O4 anode materials possessing superior electrochemical properties. However, neither lithium ion storage behavior of ZnO/Co3O4 achieve a satised performance. Herein, based on our previous DFT results that the interface of ZnO(110)/Co3O4(220) hetero-nanostructure confer fast reaction kinetics because of more negative surface adsorption energy and lower diffusion barrier energy of lithium ions, we develop ZnO(110)/Co3O4(220)@C hetero-nanostructures with both abundant interfaces and uniform mesopores structure derived from 2D MOF precursor.

ver más...

Cation mixing in Wadsley-Roth phase anode of lithium-ion battery improves cycling stability and fast Li+ storage

Publicada en AIP Scitation, 14/07/2021.

Applied Physics Reviews, Volume 8, Issue 3, September 2021. Developing advanced electrode materials with high stability and high ion-diffusion rate is vital for the success of high-rate lithium-ion batteries (LIBs). However, the commonly used modification strategies such as carbon coating, nanoarchitecture engineering, and introducing oxygen vacancies are unavoidably meeting with the problems of high cost and complicated preparation process. Herein, we report cation-mixing effect enhanced fast Li+ storage in Wadsley-Roth phase Fe-Ti-Nb oxide (FTNO) materials by a facile solution combustion method. Co-existence of Fe3+ and Ti4+ in the crystallographic shear structure leads to enhanced cation-mixing effect with cations short-range order (SRO) in FTNO materials, thus resulting in outstanding capabilities of fast Li+ storage/diffusion, robust structure and low charge transfer resistance compared with the analogues of FeNb11O29 and Ti2Nb10O29. Consequently, a high-capacity retention of 71.8% is achieved upon 10000 cycles at 10C.

ver más...

Volver al índice

Electrolyte Chemistry Towards Improved Cycling Stability in Na Based Duallon Batteries with HighPower/Energy Storage

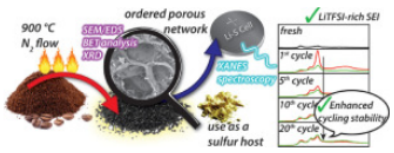
Publicada en Wiley: Batteries & Supercaps, 02/07/2021.

Dual-ion batteries (DIBs) have attracted great research interests owing to the co-utilization of cation and anion as charge carriers. Unlike the low energy density (Eden) of supercapacitors and halogen-ion batteries also with anion working, graphite-cathode-based DIBs exhibit obviously higher Eden with high working voltage. However, general electrolytes cannot satisfy the high-energy demand for Na-based DIBs with high power density.

ver más...

Pyrolysed coffee grounds as a conductive host agent for sulfur composite electrodes in Li–S batteries

Publicada en https://www.sciencedirect.com, 01/07/2021.



Biomass is an abundant and valuable carbon source that can be utilised in many applications such as gas separation and energy storage. Resolving methods to process biomass cheaply and efficiently into useful carbons for such applications remains a significant area of research. Herein carbons prepared via facile pyrolysis (or thermal transformation) of waste coffee grounds at 900 °C have been used as an electrode material for lithium–sulfur (Li–S) cells, resulting in specific capacities of ~340 mAh g1 at 0.1 C after 100 cycles and coulombic efficiencies of >98% at 1 C even after 100 cycles.

ver más...

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