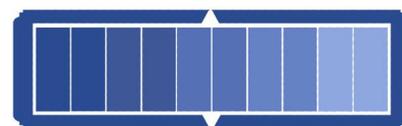


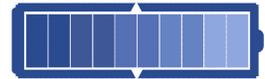
BOLETÍN DE VIGILANCIA TECNOLÓGICA E INTELIGENCIA COMPETITIVA

ALMACENAMIENTO DE ENERGÍA

FEBRERO 2020



BATTERYPLAT



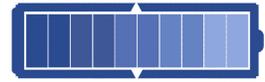
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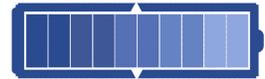
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NOTICIAS

KIST researchers develop high-capacity EV battery materials that double driving range

Publicada en Eurekalert technology & engineering, 21/02/2020.

(National Research Council of Science & Technology) Dr. Hun-Gi Jung and his research team at the Center for Energy Storage Research of the Korea Institute of Science and Technology have announced the development of silicon anode materials that can increase battery capacity four-fold in comparison to graphite anode materials and enable rapid charging to more than 80% capacity in only five minutes. When applied to batteries for electric vehicles, the new materials are expected to more than double their driving range.



[ver más...](#)

Scientists predict state of matter that can conduct both electricity and energy perfectly

Publicada en Eurekalert technology & engineering, 20/02/2020.

(University of Chicago) Three scientists from the University of Chicago have run the numbers, and they believe there may be a way to make a material that could conduct both electricity and energy with 100% efficiency--never losing any to heat or friction.

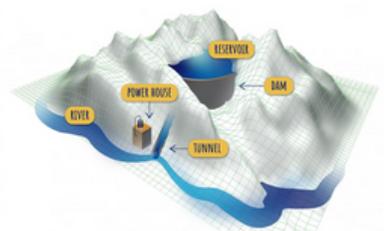


[ver más...](#)

Could water solve the renewable energy storage challenge?

Publicada en Eurekalert chemistry & physics, 19/02/2020.

(International Institute for Applied Systems Analysis) Seasonally pumped hydropower storage could provide an affordable way to store renewable energy over the long-term, filling a much needed gap to support the transition to renewable energy, according to a new study from IIASA scientists.

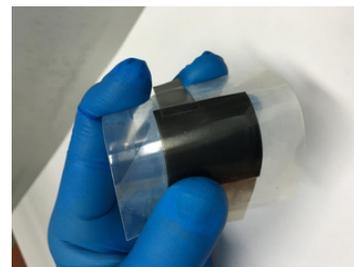


[ver más...](#)

Fast-charging, long-running, bendy energy storage breakthrough

Publicada en Eurekalert nanotechnology, 17/02/2020.

(University College London) A new bendable supercapacitor made from graphene, which charges quickly and safely stores a record-high level of energy for use over a long period, has been developed and demonstrated by UCL and Chinese Academy of Sciences researchers.



[ver más...](#)

Towards a sustainable future -- Novel technology to measure energy conversion efficiency

Publicada en Eurekalert nanotechnology, 17/02/2020.

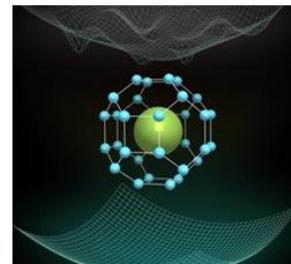
(Tokyo University of Science) Conversion of energy is a constant process but measuring the efficiency of this conversion is not an easy task. Quantifying the heat emission of the object that absorbs energy has been proven to be a good indicator. Scientists have now devised a technique that can perform this measurement easily and accurately, and this novel technology can shed light on the energy transfer processes in systems ranging from plants to solar cells.

[ver más...](#)

Buscando el superconductor a temperatura ambiente

Publicada en Revista Dyna - Ingeniería e Industria , 16/02/2020.

Actualmente, conseguir algún tipo de superconductividad, se alcanza utilizando diferentes tipos de aleaciones, como hemos publicado en DYNA (ver La superconductividad y sus aplicaciones en los enlaces.

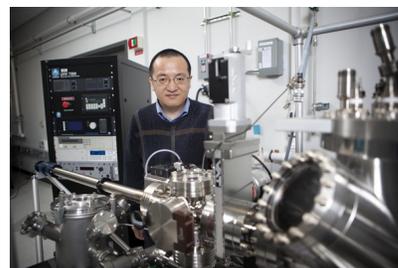


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New research could aid cleaner energy technologies

Publicada en Eurekalert technology & engineering, 30/01/2020.

(Binghamton University) New research led by faculty at Binghamton University, State University of New York, could aid cleaner energy technologies. The atomic reaction between gases and oxides is a key piece for many technological puzzles. It can lead to benefits such as better catalysts to enable cleaner energy technologies, or to problems like corrosion.



[ver más...](#)

Self-learning heating control system saves energy

Publicada en Eurekalert technology & engineering, 30/01/2020.

(Swiss Federal Laboratories for Materials Science and Technology (EMPA)) Can buildings learn to save all by themselves? Empa researchers think so. In their experiments, they fed a new self-learning heating control system with temperature data from the previous year and the current weather forecast. The 'smart' control system was then able to assess the building's behavior and act with good anticipation. The result: greater comfort, lower energy costs.

[ver más...](#)

Think distributed solar-plus-storage isn't cost-effective? Think again

Publicada en GreenBiz, 23/01/2020.

Commercial customers paying demand charges and time-of-use rates should seriously consider an investment in these assets. As shown in a recent RMI report, battery energy storage costs are less than a fifth of what they were a decade ago. This is enabling batteries to become cost-effective in a growing list of locations and use cases, such as balancing the grid, reducing customer demand peaks and providing backup power. In particular, behind-the-meter solar-plus-storage often can deliver bill savings for large commercial and industrial users that have high demand charges — typically greater than \$10 to \$15 per kilowatt (kW) — or have time-of-use (TOU) utility rates.

[ver más...](#)

New computational screening approach identifies potential solid-state electrolytes

Publicada en Eurekalert technology & engineering, 15/01/2020.

(National Centre of Competence in Research (NCCR) MARVEL) Though researchers have been looking for solid-state electrolytes that could enhance both the safety and performance of lithium-ion batteries for decades, no thoroughly suitable candidate has been found. Computational screening may offer better chances of success. In a recent paper, NCCR MARVEL researchers presented a computational framework for predicting the diffusion of Li-ions in solid-state materials, showed how to employ it in large-scale screening and used it to identify new compounds for further experimental investigation.

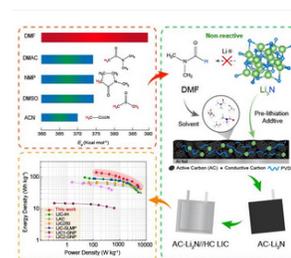


[ver más...](#)

New technology for pre-replenishing lithium for lithium ion supercapacitors

Publicada en Eurekalert chemistry & physics, 14/01/2020.

(Science China Press) Li₃N containing electrode is prepared by a commercially adoptable route, using DMF to homogenate the electrode slurry. The DMF molecular stabilizing mechanism is confirmed via experiment analysis and DFT simulation. The soft package lithium-ion capacitors (LIC250) with 12wt% Li₃N addition in AC positive electrode exhibits excellent rate capability, cyclic stability and ultrahigh specific energy. Its specific energy is 2.3 times higher than the Li₃N-free devices, with energy retention as high as 90% after 10,000 cycles.



[ver más...](#)

EMPRESAS Y MERCADOS

DC/DC converter with integrated transformer shrinks solution size by as much as 80%

Publicada en Electronic Products Power, 14/02/2020.

TI's high-efficiency isolated DC/DC converter developed with its new EMI-optimized integrated transformer technology can shrink a design's power solution by as much as 80% compared to discrete solutions. Texas Instruments (TI) has developed its first integrated circuit (IC) with a new proprietary EMI-optimized integrated transformer technology. TI claims that the 500-mW high-efficiency isolated DC/DC converter offers the industry's lowest electromagnetic interference (EMI).

[ver más...](#)

Tesla Partners With LG Chem And CATL For EV Batteries

Publicada en Inside EVS, 30/01/2020.

Tesla adds more battery suppliers to the equation as the company needs more cells at new production sites. esla adds more battery suppliers to the equation as the company needs more cells at new production sites. Reuters reports that Tesla said on Wednesday that it has entered into a partnership with LG Chem and CATL for the supply of EV batteries. It's hard to track any details from any of those companies ("LG Chem declined to comment", "CATL did not respond... requests for comment", "Tesla was not immediately available to comment"), but it seems that at least for China (Tesla Gigafactory 3), Tesla will use LG Chem and CATL batteries. It's not yet known whether Panasonic is also engaged in battery supply for the Gigafactory 3 in Shanghai.

[ver más...](#)

Frost Radar: Outlook for the Global Energy Storage Industry, 2020

Publicada en Frost & Sullivan - Almacenamiento de la energía, 29/01/2020.

Energy storage is gaining importance with increasing demand for energy in residential and industrial applications. With growing data consumption and a proliferation of cloud services, the demand for energy increases proportionately. Energy storage is a viable solution to utilize renewable energy and an attractive option for implementing clean energy sources.

[ver más...](#)

Volkswagen to buy 20% of Chinese battery maker Guoxuan

Publicada en Electrive, 17/01/2020.

Volkswagen wants to buy 20 per cent of the Chinese electric car battery manufacturer Guoxuan High-Tech. There had already been rumours to this effect in August. According to the Reuters news agency, most of the details of the deal have already been finalised. Based on Guoxuan's market capitalisation of \$2.8 billion, VW's 20 per cent [...] The post Volkswagen to buy 20% of Chinese battery maker Guoxuan appeared first on electrive.com.



[ver más...](#)

Volvo To Build Battery Assembly Facility At Its U.S. Plant

Publicada en Inside EVS, 16/01/2020.

Production of an all-electric XC90 in the U.S. will be supported by a local pack assembly facility. According to the latest media report, as part of the \$600 million investment project at its Ridgeville, South Carolina plant, Volvo will build a battery pack assembly facility to support upcoming BEV production. The other part of the investment is a second production line and Volvo Car University. The battery pack production facility should be completed in 2021, just in time for the first all-electric model that will be produced at the Ridgeville plant for global markets from 2022.

[ver más...](#)

Tesla distances from German battery production

Publicada en Electrive, 14/01/2020.

Tesla does not plan to manufacture lithium-ion cells near Berlin in the first construction phase. This could be due to the tight schedule. Meanwhile, the Tesla Model Y has received certification from the California Air Resources Board (CARB) in the USA. Little by little, more and more details about the planned Tesla factory in Brandenburg [...] The post Tesla distances from German battery production appeared first on [electrive.com](#).

[ver más...](#)

Webasto builds new battery centre in China

Publicada en Electrive, 13/01/2020.

The German supplier Webasto has opened a new battery centre in Jiaxing. The Chinese plant also produces roof systems. Jiaxing is the eleventh Webasto site in China – and not the first on the subject of electromobility. Since last fall, Webasto has also been producing electric heating systems and charging stations for the Chinese market [...] The post Webasto builds new battery centre in China appeared first on electrive.com.

[ver más...](#)

Alstom orders batteries for fuel cell trains from Akasol

Publicada en Electrive, 13/01/2020.

Akasol will supply battery systems for more than 40 hydrogen trains of the type Alstom Coradia iLint, which were ordered from Alstom by the regional public transport company of Lower Saxony and the Rhine-Main transport association. With this significant order, worth a low double-digit million euro amount, Akasol has also expanded in the field of [...] The post Alstom orders batteries for fuel cell trains from Akasol appeared first on electrive.com.



[ver más...](#)

VW Confirms ID.3 With Biggest Battery Seats Only Four: New Details

Publicada en Inside EVS, 13/01/2020.

The first batch of hundreds of ID.3 are parked at dedicated sites. Will be tested by employees. The first batch of hundreds of ID.3 are parked at dedicated sites. Will be tested by employees. Thanks to Battery Life, we have learned a few new things about the upcoming Volkswagen ID.3, which will be handed to the first customers in Summer 2020. Possible delays and worrying news about the standard equipment of 1ST edition cars (first 30,000 units) were explained and a few things are really interesting and not necessarily positive. Let's start with the most important thing - Volkswagen says that it will manage to deliver cars in the Summer of 2020 and there is no change in the timing (although some hoped for June rather than August

[ver más...](#)

SK Innovation Hints At New Battery Plants In The U.S. And Hungary

Publicada en Inside EVS, 10/01/2020.

SK Innovation might build a second battery plant in the U.S. and expand its upcoming 2nd plant in Hungary. SK Innovation, South Korea's biggest oil refiner and one of the leading battery manufacturers, once again shared battery manufacturing capacity expansion plans. The South Korean company is already busy at several new sites. The latest plans concern the U.S. and Hungary/Europe where SK Innovation faces even higher demand for lithium-ion cells than previously anticipated.



[ver más...](#)

Developments in H2 storage using nanoparticles

Publicada en Electrive, 09/01/2020.

At the Helmholtz-Zentrum Geesthacht (HZG) in Germany, materials researchers are developing hydrogen storage systems based on light metal hydrides. Now they have published a new concept with which these hydrogen storage systems could be refilled five times faster at a working temperature below 180 degrees. Storing hydrogen is one of the biggest challenges of hydrogen [...] The post Developments in H2 storage using nanoparticles appeared first on electrive.com.

[ver más...](#)

Mercedes shows car with compostable battery at CES

Publicada en Electrive, 07/01/2020.

At the CES, Mercedes-Benz is presenting the Vision Avtr, a fully electrically powered concept car that not only has a futuristic design but also features visionary battery technology. According to the company, the 110-kWh battery with graphene-based organic cell chemistry is free of rare earths and metals. The battery's materials are compostable and thus completely [...] The post Mercedes shows car with compostable battery at CES appeared first on electrive.com.



[ver más...](#)

ProLogium presents solid state battery at CES

Publicada en Electrive, 06/01/2020.

The Taiwanese battery cell manufacturer ProLogium has presented a solid state battery package for electric cars, buses and two-wheelers at CES. ProLogium has already signed several strategic cooperation agreements with several car manufacturers to test its MAB solid state battery package. MAB stands for the “Multi Axis BiPolar+” technology on which ProLogium relies. In order [...] The post ProLogium presents solid state battery at CES appeared first on [electrive.com](#).

[ver más...](#)

Suzuki, Toshiba & Denso to build battery factory in India

Publicada en Electrive, 02/01/2020.

In India, Japanese companies Suzuki, Toshiba and Denso are building a battery cell factory for electric vehicles in Gujarat. The Automotive Electronics Power Pvt. Ltd (AEPPL) joint venture was established for this purpose and is owned 50 per cent by Suzuki, 40 per cent by Toshiba and ten per cent by Denso. The JV is [...] The post Suzuki, Toshiba & Denso to build battery factory in India appeared first on [electrive.com](#).

[ver más...](#)

Tesla patents new battery cell chemistry

Publicada en Electrive, 02/01/2020.

Tesla has submitted a new patent for improved battery cell chemistry under the title “Dioxazolones and nitrile sulfites as electrolyte additives for lithium-ion batteries”. This is intended to increase the performance and service life of the batteries as well as reducing costs. The new development is the work of Jeff Dahn and his Canadian laboratory [...] The post Tesla patents new battery cell chemistry appeared first on electrive.com.



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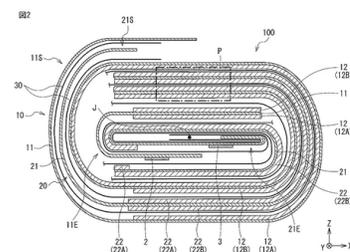
PATENTES

Secondary battery, battery pack, electric vehicle, power storage system, electric tool, and electronic apparatus

Publicada en Tecnologías asociadas a baterías, supercapacitores, supercondensadores, acumuladores, 12/02/2020.

Solicitante: MURATA MANUFACTURING CO., LTD. [JP]

This secondary battery is provided with a winding electrode body which includes a positive electrode, a negative electrode, and a separator, and in which the positive electrode and the negative electrode layered each other with the separator interposed therebetween are wound about a winding axis. A cross section, of the winding electrode body, orthogonal to the winding axis has a planar shape that is defined by a flat part and a pair of curved parts opposed to each other with the flat part interposed therebetween.



[ver más...](#)

Solid electrolytes, electronic devices, and methods

Publicada en Tecnologías asociadas a baterías, supercapacitores, supercondensadores, acumuladores, 12/02/2020.

Solicitante: THE FLORIDA STATE UNIVERSITY RESEARCH FOUNDATION, INC. [US]

Solid electrolytes, including lithium-argyrodite solid electrolytes, and electronic devices, such as lithium-ion batteries that include the solid electrolytes. Methods of making solid electrolytes, including methods for making solid electrolytes with varying degrees of lithium deficiency.

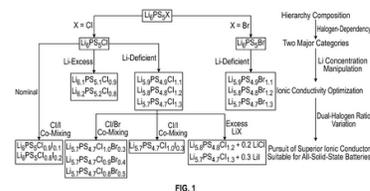


FIG. 1

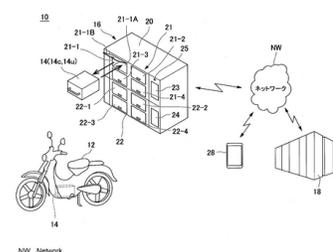
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Battery usage system, storage device, battery usage method, program, and storage medium

Publicada en Tecnologías asociadas a baterías, supercapacitadores, supercondensadores, acumuladores, 05/02/2020.

Solicitante: HONDA MOTOR CO., LTD.

The battery usage system according to the present invention comprises: a battery that is removably installed in an electrical power device that uses electrical power; a storage device for storing the battery; a notification unit for providing notifications of information pertaining to the usability of the battery stored in the storage device; and a detection unit for detecting, with or without contact, a reservation-holding user that is a user who has made a reservation to use the battery. When a reserved battery that is constituted by the battery reserved by the reservation-holding user is being stored in the storage device, the notification unit, on the basis of the reservation-holding user detected by the detection unit, provides notification indicating that the reserved battery is usable.



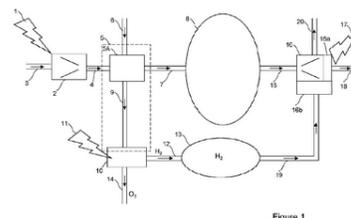
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Energy storage with hydrogen

Publicada en Tecnologías asociadas a almacenamiento de energía, 05/02/2020.

Solicitante: STORELECTRIC LIMITED [GB]

A method of energy storage comprises receiving input energy (1) and using the input energy to compress (2) air or other process gas to produce a compressed process gas. The compressed process gas is stored (8). The compressed process gas is expanded (16) to generate output energy (17). Heat is transferred (5) from the process gas, before the process gas is stored (8) as a compressed process gas, to a hydrogen production process (10). The transferred heat is used in the hydrogen production process (10). The hydrogen may be stored (13) and subsequently used to heat to provide heat prior to, during, or after expanding (16) the compressed gas.



[ver más...](#)

Storage battery unit and method for detecting fire of storage battery unit

Publicada en Tecnologías asociadas a baterías, supercapacitadores, supercondensadores, acumuladores, 05/02/2020.

Solicitante: HITACHI, LTD. [JP]

In the present invention, in order to establish a method for quickly and accurately detecting fire of a storage battery unit from among already-used devices without adding a device, a control unit that monitors a state of a storage battery unit comprising a plurality of storage battery cells and that controls charging/discharging, has a function of monitoring temperature states of the plurality of storage battery cells and determining a temperature difference between the storage battery cells. Regarding a storage battery cell detected to have a temperature equal to or higher than a first threshold value, the control unit opens a line breaker connected in series to the cell, compares the detected temperature of the cell with the detected temperature of a storage battery cell other than the cell, and determines that occurrence of a fire of the storage battery unit has been detected.

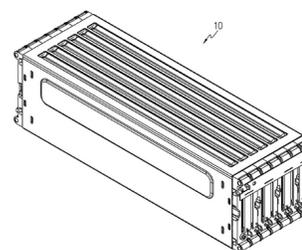
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Battery module, and battery pack and energy storage system including the same

Publicada en Tecnologías asociadas a baterías, supercapacitadores, supercondensadores, acumuladores, 29/01/2020.

Solicitante: LG CHEM, LTD.

A battery module having a plurality of battery cells stacked on one another, each battery cell having a first electrode lead protruding therefrom, and at least one sensing assembly mounted to at least one side of the plurality of battery cells and configured to electrically connect the first electrode leads is provided. The at least one sensing assembly includes a sensing bus bar electrically connected to the first electrode leads, and a plurality of sensing housing parts configured so that the sensing bus bar is mounted to a front surface thereof. Each sensing housing part of the plurality of sensing housing parts allowing a corresponding first electrode lead to pass therethrough toward the sensing bus bar. Each sensing housing part being detachably assembled with an adjacent sensing housing part of the plurality of sensing housing parts.



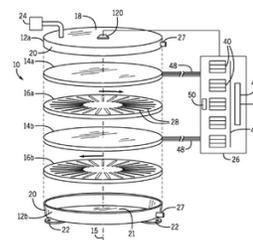
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Bearing-Less Electrostatic Flywheel

Publicada en Tecnologías asociadas a almacenamiento de energía, 29/01/2020.

Solicitante: Wisconsin Alumni Research Foundation

A bearing-less flywheel both exchanges energy with a rotating flywheel using a regenerative controller via a rotating electrostatic field but also suspends the flywheel with an electrostatic field to provide a compact robust mechanism for energy storage.



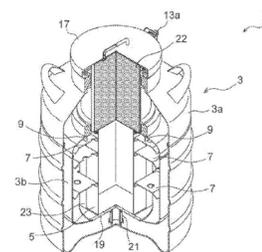
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Container for both cryopreservation and transportation

Publicada en Tecnologías asociadas a almacenamiento de energía, 29/01/2020.

Solicitante: TAIYO NIPPON SANSO CORPORATION MEDICEO CORPORATION

An object of the present invention to provide a container for both cryopreservation and transportation in which a cryogenic liquefied gas can be accumulated in a liquid state in a thermal insulating container, and a substance stored can be sufficiently cooled without coming into contact with the cryogenic liquefied gas, and contamination by the cryogenic liquefied gas, the present invention provide a container 1 for both cryopreservation and transportation including a thermal insulating container 3 which has an inlet-outlet port 15 for a substance to be stored and a lid 17 for opening and closing the inlet-outlet port 15 at the top thereof.



[ver más...](#)

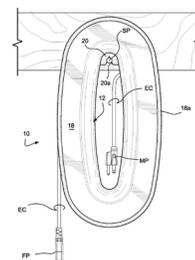
Electrical extension cord organizer and storage device

Publicada en Tecnologías asociadas a almacenamiento de energía, 29/01/2020.

Solicitante: Kenneth W. BRITT

Electrical cord organization and storage devices are provided which include a central body ring having a generally U-shaped cross-section and establishes a concave cradle to receiving an electrical cord therein. The central body ring may be formed such that it includes an opposed pair of radiused end surfaces and an opposed pair of convexly curved side surfaces having ends jointed to the end surfaces. The radiused end surfaces and the convexly curved side surfaces will therefore define a central opening having a generally symmetrical oblong, oval or elliptical shape.

[ver más...](#)



Heat storage system and installation method of latent heat storage material thereof

Publicada en Tecnologías asociadas a baterías, supercapacitadores, supercondensadores, acumuladores, 29/01/2020.

Solicitante: YAZAKI ENERGY SYSTEM CORPORATION

There is provided a heat storage system including: an indoor space; a heat storage space which is adjacent to the indoor space and in which a latent heat storage material having a melting point or a freezing point in a range of 5° C. or higher and 30° C. or lower is installed; and a natural ventilator controlling introduction and blocking of outside air to the heat storage space, in which a heat resistance between the heat storage space and the outside air is set to be greater than a heat resistance between the heat storage space and the indoor space.

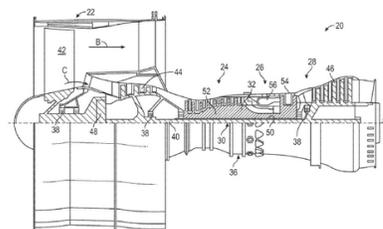
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Hybrid energy storage system control for an aircraft engine

Publicada en Tecnologías asociadas a almacenamiento de energía, 29/01/2020.

Solicitante: United Technologies Corporation

A power system of an aircraft includes a hybrid energy storage system with at least two energy storage subsystems each having a different power-energy density. The power system also includes one or more electric motors operably coupled to the hybrid energy storage system and to an aircraft engine. The power system further includes a means for controlling one or more electric power flows of the hybrid energy storage system to/from the one or more electric motors based on a modeled electric power demand associated with an engine load of one or more spools of the aircraft engine.



[ver más...](#)

Internally heated phase change material heat batteries

Publicada en Tecnologías asociadas a baterías, supercapacitadores, supercondensadores, acumuladores, 29/01/2020.

Solicitante: SUNAMP LIMITED [GB]

There is herein defined phase change material (PCM) battery designs which are heated. More particularly, there is described integrally and/or internally located heating devices (e.g. electrical heating devices) in a range of heat batteries containing PCM. In particular, there is described a PCM heat battery comprising: a PCM enclosure capable of holding PCM; PCM located in the enclosure; an electronic control system for the PCM heat battery; a heating device located in the PCM heat battery; wherein the heating device is capable of heating and/or charging the PCM.

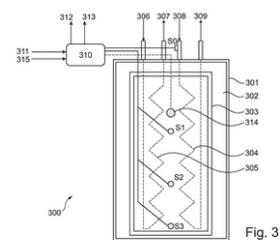


Fig. 3

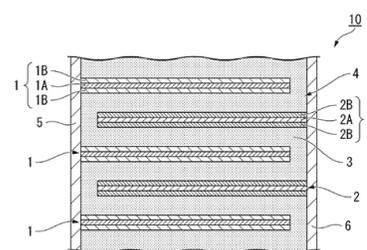
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Lithium ion-conducting solid electrolyte and solid-state lithium ion rechargeable battery

Publicada en Tecnologías asociadas a baterías, supercapacitadores, supercondensadores, acumuladores, 29/01/2020.

Solicitante: TDK CORPORATION

A lithium ion-conducting solid electrolyte containing at least one metallic element selected from the group made of Zn, Ca, Mg, and Cu within a range of 0.01% by mass to 3.0% by mass, and a solid-state lithium ion rechargeable battery containing this lithium ion-conducting solid electrolyte.



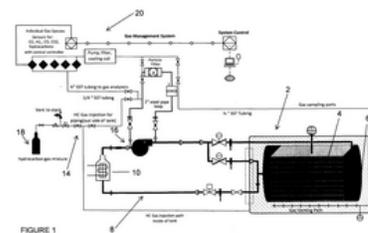
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Modified inert gas atmosphere and graphite based thermal energy storage

Publicada en Tecnologías asociadas a almacenamiento de energía, 29/01/2020.

Solicitante: KELVIN THERMAL ENERGY INC. [Canada]

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.



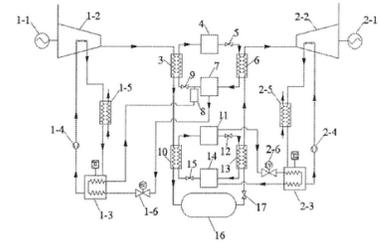
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Regenerative compressed air energy storage system and using method thereof

Publicada en Tecnologías asociadas a almacenamiento de energía, 29/01/2020.

Solicitante: Tsinghua University

The present disclosure relates to the field of energy storage, and provides a regenerative compressed air energy storage system and a using method thereof. The system comprises a compressor unit, a high-temperature heat exchanger, a medium-temperature heat exchanger, an air storage chamber, a regulating valve, a medium-temperature regenerator, a high-temperature regenerator and an expander unit which are connected in sequence. The low-temperature side of the high-temperature heat exchanger, a high-temperature heat reservoir, a first valve, the high-temperature side of the high-temperature regenerator, a high-temperature cold reservoir and a second valve are connected in sequence.



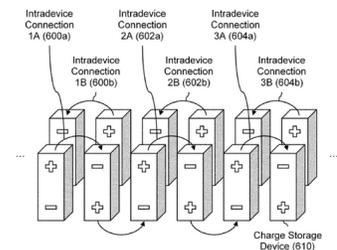
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Series batteries to reduce an interfering magnetic field

Publicada en Tecnologías asociadas a baterías, supercapacitadores, supercondensadores, acumuladores, 29/01/2020.

Solicitante: Cora Aero LLC

A first portion of a series battery is arranged where the first portion of the series battery produces a first magnetic field and the series battery includes a plurality of charge storage devices, a negative output terminal, a positive output terminal, and a plurality of intradevice connections connecting the plurality of charge storage devices in series. A second portion of the series battery is arranged such that a second magnetic field produced by the second portion of the series battery at least partially cancels out the first magnetic field.



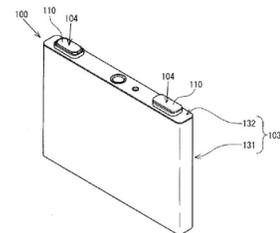
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Soc estimation device of energy storage device, energy storage apparatus, and soc estimation method of energy storage device

Publicada en Tecnologías asociadas a almacenamiento de energía, 29/01/2020.

Solicitante: GS Yuasa International Ltd.

An SOC estimation device 50 of an energy storage device includes a storage unit 73 and a data processing unit 71. The energy storage device 100 has a characteristic including a first deterioration mode in which a capacity drop with respect to time indicates a first transition, and a second deterioration mode in which a capacity drop indicates a second transition. The storage unit 73 holds first correlation data M1 indicating a correlation between SOC and OCV of the energy storage device in the first deterioration mode, and second correlation data M2 indicating a correlation between SOC and OCV of the energy storage device in the second deterioration mode.



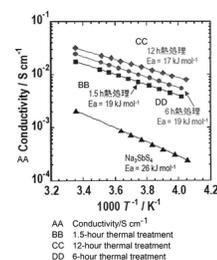
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Solid electrolyte for all-solid-state sodium battery, manufacturing method therefor, and all-solid-state sodium battery

Publicada en Tecnologías asociadas a baterías, supercondensadores, supercondensadores, acumuladores, 29/01/2020.

Solicitante: UNIVERSITY PUBLIC CORPORATION OSAKA [JP]

A solid electrolyte for an all-solid-state sodium battery represented by the formula $\text{Na}_{3-x}\text{Sb}_{1-x}\text{S}_4$ (in the formula, is selected from among elements in which $\text{Na}_{3-x}\text{Sb}_{1-x}\text{S}_4$ exhibits a higher ion conductivity than Na_3SbS_4 , and x is 0



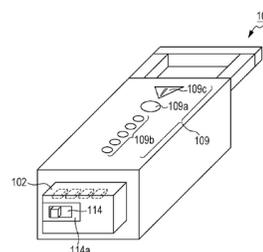
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Storage battery pack and method of operating the same

Publicada en Tecnologías asociadas a baterías, supercapacitores, supercondensadores, acumuladores, 29/01/2020.

Solicitante: PANASONIC INTELLECTUAL PROPERTY MANAGEMENT CO., LTD.

A battery pack includes a secondary battery, a circuit having a consumer consuming power of the battery, terminals charging or discharging the pack, a switch that, when the voltage of the battery reaches the discharge cutoff voltage, is opened to stop discharge of the battery through the terminals, and a controller performing a first discharge operation activating the circuit and causing the consumer to consume a remaining power of the battery until a voltage of the battery reaches a first threshold value, higher than the discharge cutoff voltage, and stopping, when the voltage of the battery reaches the first threshold value, the first discharge operation.



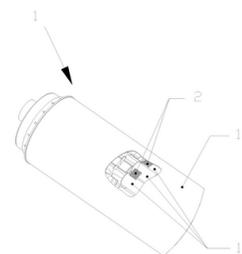
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Storage battery, energy recovery system and method for ship body, and ship body

Publicada en Tecnologías asociadas a baterías, supercapacitores, supercondensadores, acumuladores, 29/01/2020.

Solicitante: SEAJET WATERCRAFT SHENZHEN CO., LTD. [CN]

Disclosed are a storage battery, an energy recovery system and method for a ship body, and a ship body. The storage battery energy recovery system mainly comprises the storage battery (1) and a thermoelectric device (2). The storage battery (1) comprises a cell (11), a metal shell (12), and an electronic control unit (13), wherein chemical energy inside the cell (11) is converted into electrical energy and thermal energy; a cold terminal of the thermoelectric device (2) is connected to a metal surface of the shell (12), and a hot terminal thereof is connected to a metal surface of the cell (11), thus forming a thermoelectromotive force loop



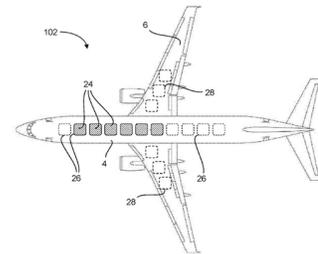
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Distributed energy storage system

Publicada en Tecnologías asociadas a almacenamiento de energía, 22/01/2020.

Solicitante: ROLLS-ROYCE plc

A modular energy storage system within a vehicle, wherein the energy storage system comprises a plurality of discrete energy storage units which are movable within the vehicle and selectively securable in a variety of positions.



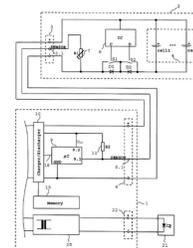
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Emergency lighting converter

Publicada en Tecnologías asociadas a almacenamiento de energía, 22/01/2020.

Solicitante: TRIDONIC GMBH & CO KG

The invention is in the field of emergency lighting devices and power supply of emergency lighting devices. A LED converter for an emergency lighting unit comprises a LED driver for supplying a current to a LED lighting device, an energy storage interface for connecting an energy storage device, a charging circuit for charging the energy storage, and a control circuit. The energy storage interface is configured to connect at least two different types of energy storage devices. The charging circuit sets at least one energy storage management parameter according to the type of energy storage device connected by the energy storage interface.



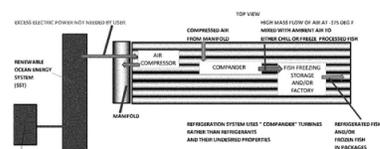
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Energy storage barge

Publicada en Tecnologías asociadas a almacenamiento de energía, 22/01/2020.

Solicitante: EnisEnerGen LLC

An Energy Storage Barge provides supplemental energy for a power system when renewable energy sources fail to provide enough hour at peak times. In an embodiment, the Energy Storage Barge is further provided a freeze chamber for pure water and mineral collection. In another embodiment, the Energy Storage barge produces super-chilled air to conduct freeze processing or maintain temperature of a cold storage facility.



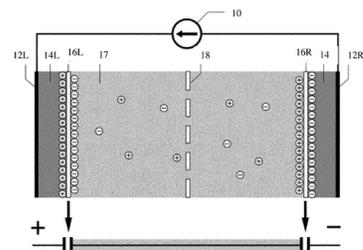
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Engineering energy storage devices by controlling defects in carbon-based electrodes

Publicada en Tecnologías asociadas a baterías, supercondensadores, supercondensadores, acumuladores, 22/01/2020.

Solicitante: New York University

An energy storage device containing a carbon-based electrode composed of graphitic film having a density of specific types of structural defects is explained. The carbon-based electrode may be used as an electrode in a supercapacitor or as an anode layer of a rechargeable battery. A distributed model is developed that predicts the area-normalized apparent capacitance from the density of point and line defects in the graphitic film. From this model, one can engineer the apparent capacitance by controlling the density of point and line defects.



[ver más...](#)

Insulation detection device and method for energy storage system

Publicada en Tecnologías asociadas a almacenamiento de energía, 22/01/2020.

Solicitante: Contemporary Amperex Technology Co., Limited

The present disclosure provides an insulation detection device and method for an energy storage system. The insulation detection device includes a positive switching device, a negative switching device, a sampling unit, a reference voltage terminal and a processor. The sampling unit is configured to collect a positive sampled signal on the energy storage device when the positive switching device and the negative switching device are in a first switching state, and collect a negative sampled signal on the energy storage device when the positive switching device and the negative switching device are in a second switching state; and the processor is configured to determine a positive insulation resistance value and a negative insulation resistance value of the energy storage device according to the positive sampled signal and the negative sampled signal.

[ver más...](#)

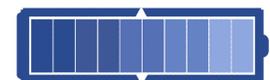
Production method for solid electrolyte

Publicada en Tecnologías asociadas a baterías, supercapacitadores, supercondensadores, acumuladores, 22/01/2020.

Solicitante: IDEMITSU KOSAN CO.,LTD.

Provided is a production method for a solid electrolyte containing elemental lithium, elemental phosphorus, elemental sulfur, and a halogen element, and having peaks at $2\theta = 20.2\pm 0.5^\circ$ and $23.6\pm 0.5^\circ$ as measured by X-ray diffraction measurement using CuK ray, the method using a material containing yellow phosphorus and a compound containing elemental lithium, elemental phosphorus, elemental sulfur, and the halogen element.

[ver más...](#)

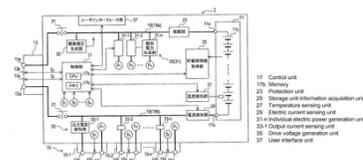


Charge/discharge device and method for managing stored electric power in electric power storage unit

Publicada en Tecnologías asociadas a baterías, supercapacitadores, supercondensadores, acumuladores, 15/01/2020.

Solicitante: MAKITA CORPORATION [JP]

A charge/discharge device according to one aspect of the present disclosure is provided with an electric power storage unit, an electric power reception unit, an electric power generation unit, a plurality of electric power output units, and a control unit. The electric power reception unit receives a charging power for charging an electric automobile from a battery charger.



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Dual-battery charging and discharging method and apparatus, terminal, and storage medium

Publicada en Tecnologías asociadas a baterías, supercapacitadores, supercondensadores, acumuladores, 15/01/2020.

Solicitante: ZTE CORPORATION [CN]

Provided by the present disclosure is a dual battery charging and discharging method used for a dual-screen terminal, the dual-screen terminal comprising a first display screen, a second display screen, a first battery, and a second battery, wherein the first battery is placed at a back surface of the first display screen, and the second battery is placed at a back surface of the second display screen, the method comprising: obtaining a state identifier of the first display screen and a state identifier of the second display screen; determining whether the dual-screen terminal is in a charging state; in response to determining that the dual-screen terminal is in a charging state, controlling the first battery and the second battery to charge according to the state identifier of the first display screen and the state identifier of the second display screen

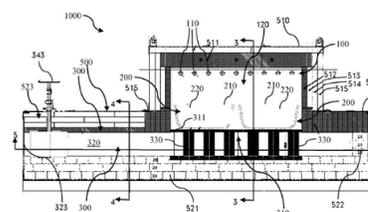
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Energy Storage and Retrieval System

Publicada en Tecnologías asociadas a almacenamiento de energía, 15/01/2020.

Solicitante: 1414 Degrees Limited

An energy storage and retrieval system is disclosed. The system includes a heat generating layer for generating thermal energy based on input electrical energy, a thermal energy storage layer located to receive thermal energy from the heat generating layer, the thermal energy storage section layer including a thermal energy storage material to store thermal energy.



[ver más...](#)

Monolithic flexible supercapacitors, methods of making and uses thereof

Publicada en Tecnologías asociadas a almacenamiento de energía, 15/01/2020.

Solicitante: Massachusetts Institute of Technology [US]

Disclosed are methods for fabricating supercapacitors (SCs) via vapor printing, specifically oxidative chemical vapor deposition (oCVD). Also disclosed are methods of using the supercapacitors, in particular for energy storage devices and photovoltaics.



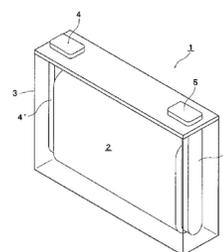
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Nonaqueous electrolyte energy storage device and method for producing same

Publicada en Tecnologías asociadas a almacenamiento de energía, 15/01/2020.

Solicitantes: GS Yuasa International Ltd.

A nonaqueous electrolyte energy storage device according to one aspect of the present invention is a nonaqueous electrolyte energy storage device including a positive electrode which has a conductive substrate and a positive electrode composite layer layered on the substrate, wherein the substrate is made from an aluminum alloy containing an element other than aluminum at a content of 1% by mass or more, and the positive electrode composite layer contains particles A and particles B having different particle sizes from each other as positive active materials.



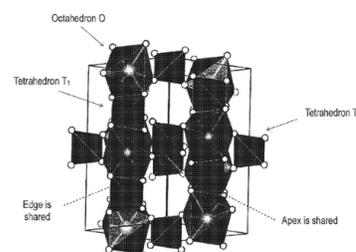
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Production method for lgps-based solid electrolyte

Publicada en Tecnologías asociadas a baterías, supercapacitores, supercondensadores, acumuladores, 15/01/2020.

Solicitante: MITSUBISHI GAS CHEMICAL COMPANY, INC.

The present invention provides an LGPS-based solid electrolyte production method characterized by having a step in which a mixture of Li_3PS_4 crystals having a peak at $420 \pm 10 \text{ cm}^{-1}$ in a Raman measurement and Li_4MS_4 crystals (M being selected from the group consisting of Ge, Si, and Sn) is heat treated at $300\text{-}700^\circ \text{C}$. in addition, the present invention can provide an LGPS-based solid electrolyte production method characterized by having: a step in which Li_3PS_4 crystals having a peak at $420 \pm 10 \text{ cm}^{-1}$ in a Raman measurement, Li_2S crystals, and sulfide crystals indicated by MS2 (M being selected from the group consisting of Ge, Si, and Sn) are mixed while still having crystals present and a precursor is synthesized; and a step in which the precursor is heat treated at $300\text{-}700^\circ \text{C}$.



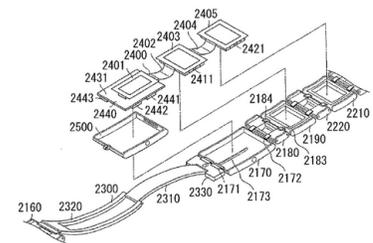
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Solid-state battery, battery pack, electric motor vehicle, power storage system, electric tool, and electronic device

Publicada en Tecnologías asociadas a baterías, supercapacitores, supercondensadores, acumuladores, 15/01/2020.

Solicitante: Murata Manufacturing Co., Ltd.

A solid-state battery that includes a cathode layer which occludes and discharges an electrode reactant ion, an anode layer which occludes and discharges the electrode reactant ion and partially faces the cathode layer, and a solid electrolyte layer between the cathode layer and the anode layer and including a high ion conductivity portion in a first region in which the cathode layer and the anode layer face each other, and a low ion conductivity portion facing the cathode layer in a second region in which the cathode layer and the anode layer do not face each other.



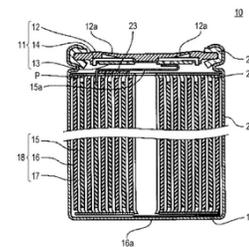
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Wound-type battery

Publicada en Tecnologías asociadas a baterías, supercapacitores, supercondensadores, acumuladores, 15/01/2020.

Solicitantes: Panasonic

A wound-type battery includes a wound electrode group having a first electrode and a second electrode with polarity opposite to the first electrode, an electrolyte, a battery case, a sealing plate that seals an opening of the battery case, an insulating plate that is disposed between the electrode group and the sealing plate and that has a hole, and a first tab that passes through the hole to electrically connect the first electrode and the sealing plate to each other. At least a part of a region of the first tab that extends through the hole to a sealing plate side is covered with a tab tape on a side facing the insulating plate.



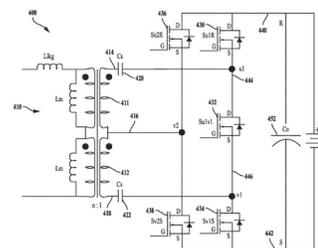
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Symmetric hybrid converters

Publicada en Tecnologías asociadas a baterías, supercondensadores, supercondensadores, acumuladores, 13/01/2020.

Solicitante: Apple Inc.

Systems and methods for power conversion are described. Symmetric topologies and modulation schemes are described that may reduce common-mode noise. For example, a system may include a transformer including a first secondary winding and a second secondary winding; a rectifier, including a set of switches, that connects taps of the first secondary winding and the second secondary winding to a first terminal and a second terminal, wherein the rectifier is symmetric with respect to the first secondary winding and the second secondary winding; a battery connected between the first terminal and the second terminal; and a processing apparatus that is configured to control the set of switches to rectify a multilevel voltage signal on the transformer



[ver más...](#)

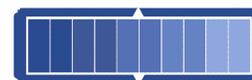
Ultracapacitor energy storage pack

Publicada en Tecnologías asociadas a almacenamiento de energía, 11/01/2020.

Solicitante: NanoMalaysia Berhad

The present invention relates to an ultracapacitor energy storage pack (100) for use in electric vehicles. The ultracapacitor energy storage pack (100) of the present invention comprises at least two subassemblies whereby the at least two subassemblies comprising a first assembly and a second assembly (102). The first assembly comprising a structural frame for enclosing the second assembly (102). The second assembly (102) being an ultracapacitor assembly (202) having a plurality of graphene-based ultracapacitors and a set of separators (204A, 204B). The plurality of graphene-based ultracapacitors is connected to each other in series at terminals end through interconnection means. The set of separators comprising a top separator (204A) and a bottom separator (204B) having cutouts for affixing the connector plates (206) on the cutouts enabling connection between the connector plate (206) and terminals of the ultracapacitors.

[ver más...](#)



Semisolid Electrolyte Solution, Semisolid Electrolyte, Semisolid Electrolyte Layer, Electrode, and Secondary Battery

Publicada en Tecnologías asociadas a baterías, supercapacitadores, supercondensadores, acumuladores, 08/01/2020.

Aiming at improvement in the life and rate characteristic of the secondary battery, the semisolid electrolytic solution, the semisolid electrolyte layer, the electrode, and the secondary battery are provided. The semisolid electrolytic solution contains a solvation electrolyte salt, an ethereal solvent for forming a solvation ion liquid together with the solvation electrolyte salt, and a low-viscosity solvent. The mixture molar ratio of the ethereal solvent to the solvation electrolyte salt is in the range from 0.5 to 1.5. The mixture molar ratio of the low-viscosity solvent to the solvation electrolyte salt is in the range from 4 to 16.

[ver más...](#)

Battery integrated modular multifunction converter for grid energy storage systems

Publicada en Tecnologías asociadas a baterías, supercapacitadores, supercondensadores, acumuladores, 08/01/2020.

Solicitante: Utah State Univesity

An apparatus includes power blocks. Each power block includes converter modules. Each converter module includes a positive and a negative bidirectional converter and a battery module. The bidirectional converters are connected to the battery module and outputs are connected in parallel. Paralleled positive bidirectional converters are connected in series between a positive connection and a neutral connection and the paralleled negative bidirectional converters of each power block are connected in series between the neutral connection and a negative connection. A DC-link controller controls a positive output voltage between the positive and neutral connections to follow a positive voltage reference and controls a negative output voltage between the neutral and negative connections to follow a negative voltage reference.

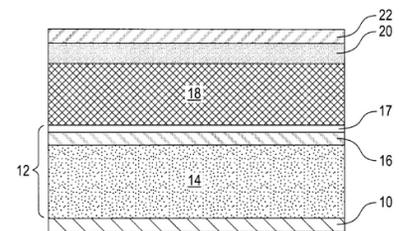
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Kinetically fast charging lithium-ion battery

Publicada en Tecnologías asociadas a baterías, supercondensadores, acumuladores, 08/01/2020.

Solicitante: International Business Machines Corporation

Rechargeable lithium-ion batteries that have a high-capacity and a fast charge rate are provided. The lithium-ion batteries contain an anode structure that is of unitary construction and includes a non-porous region and a porous region including a top porous layer (Porous Region 1) having a first thickness and a first porosity, and a bottom porous layer (Porous Region 2) located beneath the top porous layer and forming an interface with the non-porous region. At least an upper portion of the non-porous region and the entirety of the porous region are composed of silicon, and the bottom porous layer has a second thickness that is greater than the first thickness, and a second porosity that is greater than the first porosity.



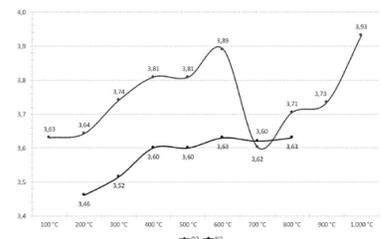
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Novel material and production thereof for use as a storage medium in a sensitive energy storage system in the low-, medium- or high-temperature range

Publicada en Tecnologías asociadas a almacenamiento de energía, 08/01/2020.

Solicitante: Fluorchemie GMBH Frankfurt [DE]

The present invention relates to a modified red mud/a modified bauxite residue and also to processes for the production thereof and to a storage medium comprising a modified red mud, to a heat storage means comprising a storage medium and to numerous uses of a modified red mud as storage medium, in particular in a heat storage means. The modified red mud contains the following components: haematite (Fe_2O_3), —corundum (Al_2O_3), —rutile (TiO_2) and/or anatase (TiO_2), —quartz (SiO_2)



[ver más...](#)

System and method for dense energy storage

Publicada en Tecnologías asociadas a almacenamiento de energía, 08/01/2020.

Solicitante: ZLOTNIKOV, Boris [IL]

A system for storing energy for outputting on demand, is disclosed, comprising a flywheel, constituting a spinning mass upon rotation thereof, an energy exchanging arrangement configured to convert energy into angular momentum of the spinning mass, and to retrieve kinetic energy from the spinning mass, a rechargeable electrical storage device which its mass constitutes a portion of the mass of the flywheel, and a control system for administering energy flow into and out from the flywheel and from the electrical storage device, whereby when the flywheel spins and the electrical storage device is both spinning as part of the flywheel and electrically charged, the density of extractable energy, stored in the electrical storage device includes the amount of extractable kinetic energy stored in its mass due to spinning.

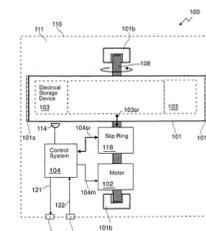


Fig. 1A

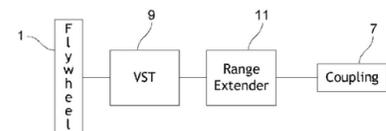
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Transmission for Energy Storage Device, Energy Storage Device and Method for Controlling the Transmission

Publicada en Tecnologías asociadas a almacenamiento de energía, 08/01/2020.

Solicitante: Punch Flybrid Limited

A transmission for an energy storage and recovery system comprises a variable slip transmission and a clutch arranged to transmit drive while slipping. The level of torque transmitted through the slipping clutch is dependent on the clutch force but is independent of the clutch slip speed. Preferably the clutch is provided by a plurality of clutches connected in parallel in a range extender. When drive is transferred between clutches in parallel, the clutch forces of both clutches are controlled to maintain the total torque transmitted by the clutches.



[ver más...](#)

A Magnetic Battery Cover for a Hearing Device

Publicada en Tecnologías asociadas a baterías, supercapacitadores, supercondensadores, acumuladores, 01/01/2020.

A hearing device comprises a device body carrying a hearing device processor for processing microphone signals to produce an output acoustic signal for delivery to a respective ear of a user. A battery compartment is provided for containing a battery to power the processor, the battery compartment bearing at least two magnets, or magnetic restraint elements. A battery cover bearing at least two magnets respectively configured to magnetically cooperate with the at least two battery compartment magnets in order to magnetically hold the battery cover against the battery compartment so as to define a battery cavity between the battery cover and the battery compartment. The magnets are positioned about the battery cavity so as to magnetically urge the battery cover to a preferred position relative to the battery compartment.

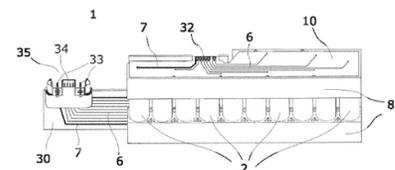
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Battery pack, frequency converter and transport system

Publicada en Tecnologías asociadas a baterías, supercapacitadores, supercondensadores, acumuladores, 01/01/2020.

Solicitante: Kone Corporation

The invention relates to a battery pack, comprising a plurality of battery cells arranged consecutively. Each of said battery cells comprise a positive and a negative terminal on opposite sides of the battery cell, the battery cells being electrically connected in series with each other, wherein the terminals of the plurality of battery cells are arranged on two opposite sides of the battery pack such that positive and negative terminals of the consecutive battery cells are on both sides of the battery pack by turns next to each other.



[ver más...](#)

Energy storage device

Publicada en Tecnologías asociadas a almacenamiento de energía, 01/01/2020.

Solicitante: CRRRC SHIJIAZHANG CO.,LTD. [CN]

An energy storage device, comprising: a shell (121) used for defining a space for containing a phase change material (122); and a heat exchanger (123) provided in the space and used for heat exchange with the phase change material (122). The heat exchanger (123) comprises at least one group of heat exchange units (1231, 1232). Each heat exchange unit (1231, 1232) comprises a heat exchange body and a heat exchange reinforced part. The heat exchange reinforced part is used for reinforcing the heat conduction of the phase change material (122) and the heat exchange body.

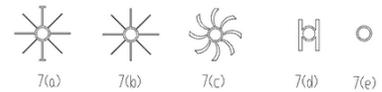


图 7

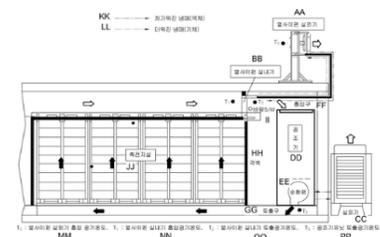
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Energy storage system which is air-conditioned using thermosiphon

Publicada en Tecnologías asociadas a baterías, supercondensadores, acumuladores, 01/01/2020.

Solicitante: KOREA ELECTRIC POWER CORPORATION

In the present invention, the temperature of a battery container is controlled using the thermosiphon principle. To this end, heat exchange between circulation air and a battery is performed by a container air conditioner, and heat of the circulation air is exchanged with the environment outside the container by the thermosiphon principle as well as by the container air conditioner. To this end, the energy storage system comprises: a container having a battery and an air conditioner therein; a partition wall disposed between the battery and the air conditioner; and an upper space and a lower space provided above and below the partition wall, respectively.



[ver más...](#)

Enhanced multi voltage dip ride through for renewable energy power plant with battery storage system

Publicada en Tecnologías asociadas a baterías, supercapacitadores, supercondensadores, acumuladores, 01/01/2020.

Solicitantes: VESTAS WIND SYSTEMS A/S [DK]

A method for operating a renewable energy power plant comprising a plurality of renewable energy generators, a plurality of power dissipation systems and a battery storage system is provided. The method comprises steps of: monitoring the statuses of the power dissipation systems; performing a ramped active power recovery operation following a voltage deviation, and controlling the battery storage system during the ramped active power recovery operation to absorb power generated by the renewable energy generators in dependence on the monitored statuses of the power dissipation systems.

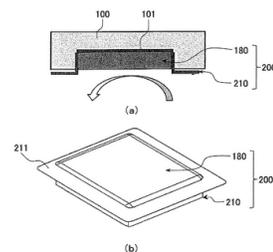
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Heat storage material unit, and automatic vending machine equipped with said heat storage material unit

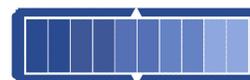
Publicada en Tecnologías asociadas a almacenamiento de energía, 01/01/2020.

Solicitante: FUJI ELECTRIC CO., LTD. [JP]

In order to improve the efficiency of solidification and melting of a heat storage material, in a heat storage material unit 200 a heat storage material 180 covered with a coating material 181 is accommodated in a metal accommodating container 210 having a high thermal conductivity, and the heat storage material unit 200 is embedded in a thermal insulation panel 100 in such a way that the accommodating container 210 is exposed inside a merchandise accommodating compartment, thereby enabling a surface of the heat storage material 180 that is embedded in the thermal insulation panel 100 also to exhibit an action equivalent to that if the accommodating container 210 is exposed in the merchandise accommodating compartment as a heat transfer element.



[ver más...](#)

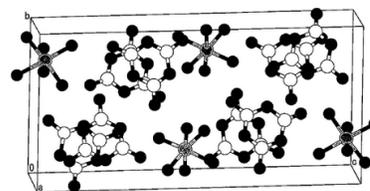


Heat-storage material comprising metal salt of cyanuric acid

Publicada en Tecnologías asociadas a almacenamiento de energía, 01/01/2020.

Solicitante: NISSAN CHEMICAL CORPORATION

A heat-storage material, in particular a chemical heat-storage material, adsorbs or desorbs water vapor (water) at a low temperature (i.e., usable at a low temperature) and stores a large amount of heat. A chemical heat-storage material includes a cyanuric acid metal salt, wherein the chemical heat-storage material generates or absorbs heat by adsorption or desorption of water vapor (water).



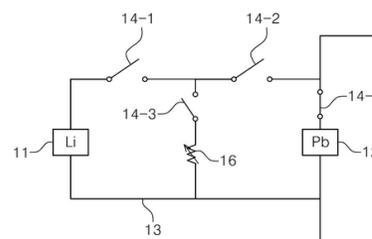
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Hybrid energy storage module system having auxiliary battery

Publicada en Tecnologías asociadas a baterías, supercapacitadores, supercondensadores, acumuladores, 01/01/2020.

Solicitante JSYOUNGTECH CO.,LTD [KR]

The present invention relates to an energy storage module system. The present invention provides a hybrid energy storage module system as an energy storage module system for supplying power necessary to the driving of a load, the hybrid energy storage module system comprising: an energy storage device which comprises a second battery module, a first battery module having a higher discharge rate than the second battery module, and a switching network for connecting the first battery module in parallel to the second battery module or disconnecting the first battery module from the second battery module, and which is connected to the load so as to supply power.



[ver más...](#)

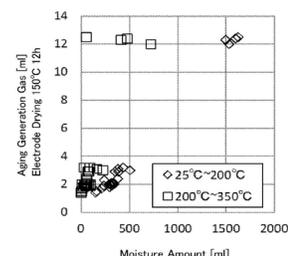
Lithium titanate powder for electrode of energy storage device, active material, and electrode sheet and energy storage device using the same

Publicada en Tecnologías asociadas a almacenamiento de energía, 01/01/2020.

Solicitante: UBE INDUSTRIES, LTD.

An object of the present invention is to provide a lithium titanate powder and an active material which, in the case of being applied as an electrode material of an energy storage device, can suppress the gas generation at high temperatures and the capacity reduction in high-temperature charge and discharge cycles and besides can also suppress the resistance rise in the high-temperature charge and discharge cycles, an electrode sheet, of an energy storage device, containing these, and an energy storage device using the electrode sheet.

[ver más...](#)

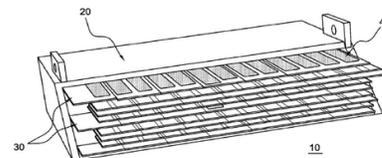


Multi-cell multi-layer high voltage supercapacitor apparatus including graphene electrodes

Publicada en Tecnologías asociadas a consumo y reciclaje de energía, 01/01/2020.

Solicitante: The Research Foundation for The State University of New York [US]

A supercapacitor apparatus within a sealed housing to provide a high-voltage EDLC energy storage unit includes cells stacked on one another, with each cell having a set of supercapacitors that are interconnected within the apparatus in a parallel-series configuration to provide an internally balanced energy storage unit that is capable of stand-off voltages of 10 volts or higher. The energy storage unit does not require balancing resistors or more complicated external balancing circuitry.



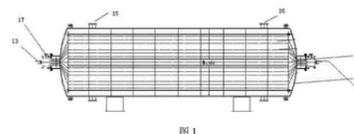
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Phase change energy storage device and energy storage and supply method

Publicada en Tecnologías asociadas a almacenamiento de energía, 01/01/2020.

Solicitante: GUANGXI BANSHIDA GREEN BUILDING ENERGY SAVING TECHNOLOGY CO., LTD [CN]

A phase change energy storage device and an energy storage and supply method. A phase change energy storage box is employed as the core of the phase change energy storage device. The phase change energy storage box is composed of an outer shell (11), an inner heat exchanger (12), a water supply end (13), a water return end (14), feeding openings (15) and discharging openings (16). The outer shell (11) is made of a thermally-insulating material.



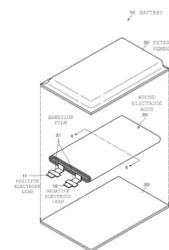
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Positive electrode, battery, battery pack, electronic device, electric motor vehicle, power storage device, and power system

Publicada en Tecnologías asociadas a baterías, supercondensadores, supercondensadores, acumuladores, 01/01/2020.

Solicitante: MURATA MANUFACTURING CO., LTD [JP]

A battery includes a positive electrode; a negative electrode; a separator; and an intermediate layer. The intermediate layer is provided between the positive electrode and the separator and includes one or both of a fluororesin and a particle. The positive electrode has a positive electrode active material layer including a fluorine-based binder having a melting point of 166° C. or less, and a content of the fluorine-based binder in the positive electrode active material layer is from 0.5% by mass to 2.8% by mass.



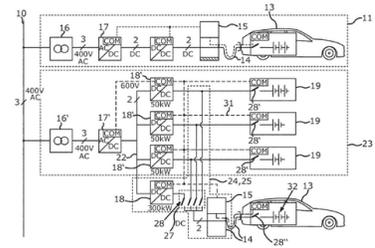
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Stationary Storage Device for Temporarily Storing Electric Energy in an Electric Supply Grid, Operating Method, and Retrofitting Module for the Stationary Storage Device

Publicada en Tecnologías asociadas a almacenamiento de energía, 01/01/2020.

Solicitante: Bayerische Motoren Werke Aktiengesellschaft [DE]

A stationary storage device configured to temporarily store electric energy in an electric supply grid includes at least one electric storage unit, each being connected to a common DC bus by a respective DC-DC converter. The storage device further includes a bidirectionally operated AC-DC converter for coupling the common DC bus to the supply grid, and a charging device configured to exchange energy with an electrically operated motor vehicle.



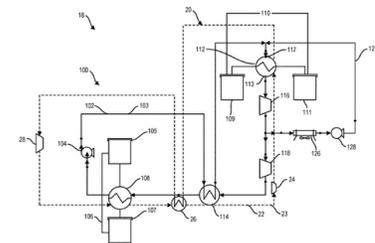
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Systems and Methods for Generating Electricity Via a Pumped Thermal Energy Storage System

Publicada en Tecnologías asociadas a almacenamiento de energía, 01/01/2020.

Solicitante: ECHOGEN POWER SYSTEMS, LLC

Systems and methods are provided for generating electricity via a pumped thermal energy storage (“PTES”) system. A system may include a pump configured to circulate a working fluid within a fluid circuit, wherein the working fluid enters the pump at a first pressure and exits at a second pressure; a first heat exchanger; a second heat exchanger; a turbine positioned between the first heat exchanger and the second heat exchanger, configured to expand a first portion of the working fluid to the first pressure; a heat rejection heat exchanger configured to remove thermal energy from a second portion of the working fluid; a high temperature reservoir connected to the first heat exchanger; and a low temperature reservoir connected to the second heat exchanger.



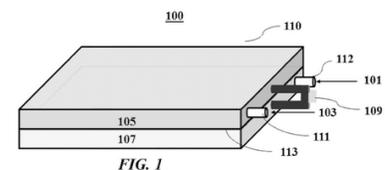
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Systems and methods for energy storage

Publicada en Tecnologías asociadas a almacenamiento de energía, 01/01/2020.

Solicitante: NIMBUS ENGINEERING INC. [US]

Provided herein are systems and methods for regenerative energy storage. A method for energy storage may comprise two or more chemiluminescent reactants, wherein a chemical reaction of the two or more chemiluminescent occurs in a containing portion of the system; a control element operatively coupled to the containing portion for controlling the chemical reaction of the two or more chemiluminescent reactants; and a photovoltaic cell surrounding at least a portion of the containing portion, wherein the photovoltaic cell is configured to (i) absorb optical energy produced from the chemical reaction, and (ii) generate electrical power from optical energy.



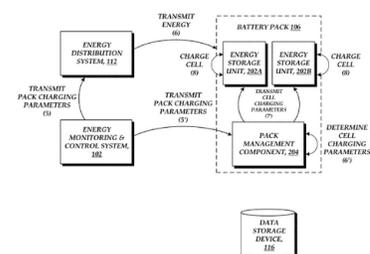
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Systems and methods for management and monitoring of energy storage and distribution

Publicada en Tecnologías asociadas a baterías, supercondensadores, supercondensadores, acumuladores, 01/01/2020.

Solicitanter: California Institute of Technology [US]

A plurality of battery packs is provided in communication with an energy monitoring and control system. Each battery pack includes a plurality of battery cells that collectively dictate the capabilities of the battery pack. The energy monitoring and control system determines a plurality of pack charging or pack discharging parameters for each battery pack that, when performed, achieve one or more performance metrics at a user level (e.g., performance metrics of each battery pack within a system of multiple battery packs). The battery pack further determines a plurality of cell charging or cell discharging parameters for each battery cell based upon the determined plurality of pack charging or pack discharging parameters for each battery cell that, when performed, achieve one or more performance metrics at a battery level



[ver más...](#)

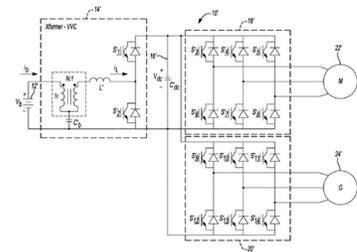
Transformer based variable voltage converter

Publicada en Tecnologías asociadas a baterías, supercapacitores, supercondensadores, acumuladores, 01/01/2020.

Solicitante: Ford Global Technologies, LLC

A vehicle electric drive includes a battery, an electric machine, and a variable voltage converter. The variable voltage converter includes switches, a transformer having a pair of windings sharing a common terminal with a series connected input capacitor, and an inductor electrically between the switches and transformer. The transformer and input capacitor are in parallel with the battery. The variable voltage converter is configured to boost voltage of the battery via operation of the switches.

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PUBLICACIONES CIENTÍFICAS

Enhanced energy storage properties in $\text{Ba}_{0.85}\text{Ca}_{0.15}\text{Zr}_{0.1}\text{Ti}_{0.9}\text{O}_3$ ceramics with glass additives

Publicada en AIP Scitation, 19/02/2020.

Journal of Applied Physics, Volume 127, Issue 7, February 2020. The $\text{Ba}_{0.85}\text{Ca}_{0.15}\text{Zr}_{0.1}\text{Ti}_{0.9}\text{O}_3$ (BCZT) ceramics added with $\text{Bi}_2\text{O}_3\text{-B}_2\text{O}_3\text{-SiO}_2$ glass were synthesized by the sol-gel method, and the effect on their microstructural, dielectric, energy storage properties has been discussed. The SEM results demonstrate that the average grain size decreases obviously with reducing glass additive, which is enriched at the grain boundary. Owing to the addition of glass additive, sintering temperature decreases significantly. Moreover, the glass additives broaden the dielectric peak and the Curie temperature shifts toward lower temperature. The ceramic with glass additive shows better impedance properties than that of pure BCZT ceramics. In addition, the coercive field and remnant polarization of hysteresis loop were greatly decreased by introducing glass additives in BCZT ceramics. Notably, the sample with 5% glass additive shows the highest energy storage density ($2.12\text{J}/\text{cm}^3$) and the largest storage efficiency (90.5%) at $330\text{kV}/\text{cm}$ electric field. These findings provide a potential pathway to enhance energy storage properties of BCZT ceramics in order to promote its energy storage application in practice.

[ver más...](#)

A composite phase change material thermal buffer based on porous metal foam and low-melting-temperature metal alloy

Publicada en AIP Scitation, 18/02/2020.

Applied Physics Letters, Volume 116, Issue 7, February 2020. Composite phase change materials consisting of a high-latent-heat phase change material (PCM) embedded in a high-thermal-conductivity matrix are desirable for thermally buffering pulsed heat loads via rapid absorption and release of thermal energy at a constant temperature. This paper reports a composite PCM thermal buffer consisting of a Field's metal PCM having high volumetric latent heat ($315\text{MJ}/\text{m}^3$) embedded in a copper (Cu) matrix having high intrinsic thermal conductivity [$384\text{W}/(\text{m}\cdot\text{K})$]. We demonstrate thermal buffer samples fabricated with Cu volume fractions from 0.05 to 0.2 and sample thicknesses ranging between 1mm and 4mm. Experiments coupled with finite element method simulations were used to determine the figures of merit (FOMs), cooling capacity eff , energy density E_{eff} , effective thermal conductivity k_{eff} , and the buffering time constant .

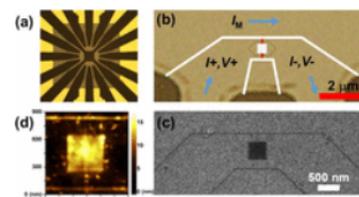
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High-transition-temperature nanoscale superconducting quantum interference devices directly written with a focused helium ion beam

Publicada en AIP Scitation, 18/02/2020.

Applied Physics Letters, Volume 116, Issue 7, February 2020. In this work, we present nanoscale superconducting quantum interference devices (SQUIDs) with dimensions as small as 10nm from the high-transition-temperature superconductor YBa_2Cu_3 (YBCO). The SQUID features and Josephson junctions are directly written into a 35-nm thick YBCO film with a focused helium ion beam. We integrate these nano-SQUIDs with directly written nano-isolated inductively coupled control lines to demonstrate a low power superconducting output driver capable of transimpedance conversion over a very wide temperature range of 4–50K.



[ver más...](#)

Drying kinetics and nucleation in evaporating sodium nitrate aerosols

Publicada en AIP Scitation, 18/02/2020.

The Journal of Chemical Physics, Volume 152, Issue 7, February 2020. A quantitative understanding of the evaporative drying kinetics and nucleation rates of aqueous based aerosol droplets is important for a wide range of applications, from atmospheric aerosols to industrial processes such as spray drying. Here, we introduce a numerical model for interpreting measurements of the evaporation rate and phase change of drying free droplets made using a single particle approach. We explore the evaporation of aqueous sodium chloride and sodium nitrate solution droplets. Although the chloride salt is observed to reproducibly crystallize at all drying rates, the nitrate salt solution can lose virtually all of its water content without crystallizing. The latter phenomenon has implications for our understanding of the competition between the drying rate and nucleation kinetics in these two systems. The nucleation model is used in combination with the measurements of crystallization events to infer nucleation rates at varying equilibrium state points, showing that classical nucleation theory provides a good description of the crystallization of the chloride salt but not the nitrate salt solution droplets. The reasons for this difference are considered.

[ver más...](#)

Anisotropy and kinetics of the migration-induced layer formation in TeO₂

Publicada en AIP Scitation, 12/02/2020.

Journal of Applied Physics, Volume 127, Issue 6, February 2020. The dynamics and anisotropy of the formation processes of near-surface structures in paratellurite (-TeO₂) single crystals due to the migration of charge carriers induced by an external electric field are studied by x-ray diffraction and electrophysical methods. Significant yet reversible variations in the parameters of the diffraction rocking curves are observed. A diffraction peak broadening occurs for both polarities with a simultaneous shift of its maximum only occurring on the surface with a positive electric potential. For the [100] direction, a much higher velocity of saturation and relaxation processes was registered compared to the [110] direction.

[ver más...](#)

High performance supercapacitor electrodes based on spinel NiCo₂O₄@MWCNT composite with insights from density functional theory simulations

Publicada en AIP Scitation, 09/02/2020.

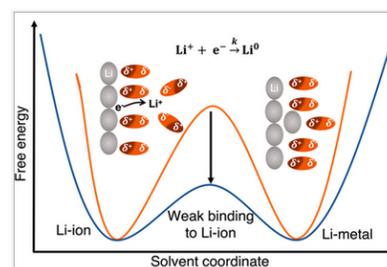
The Journal of Chemical Physics, Volume 152, Issue 6, February 2020. In this work, we demonstrated the supercapacitor performance of pristine and composites of spinel NiCo₂O₄ with a multi-walled carbon nanotube (MWCNT) assembled in a two-electrode cell configuration. Spinel NiCo₂O₄ and NiCo₂O₄@MWCNT composites were synthesized via a facile hydrothermal method. The supercapacitive performance of as-synthesized NiCo₂O₄ and NiCo₂O₄@MWCNT fabricated on Ni-foam was studied in a 0.5M K₂SO₄ electrolyte using electrochemical measurement techniques. The symmetric cell configuration of NiCo₂O₄@MWCNT delivers high specific capacitance (374 F/g at 2 A/g) with high energy density and power density (95 Wh/kg and 3 964 W/kg, respectively) compared to that of pristine NiCo₂O₄ electrodes (137 F/g at 0.6 A/g).

[ver más...](#)

Transient Voltammetry with Ultramicroelectrodes Reveals the Electron Transfer Kinetics of Lithium Metal Anodes

Publicada en ACS Energy Letters, 07/02/2020.

Fully understanding the mechanism of lithium metal deposition is critical for the development of rechargeable lithium battery anodes. The heterogeneous electron transfer kinetics are an important aspect of lithium electrodeposition, but they have been difficult to measure and understand. Here, we use transient voltammetry with ultramicroelectrodes to explicitly investigate the electron transfer kinetics of lithium electrodeposition. The results deviate from the Butler–Volmer model of electrode kinetics; instead, a Marcus model accurately describes the electron transfer.



[ver más...](#)

Hydrogen storage capability of cage-like Li₃B₁₂ clusters

Publicada en AIP Scitation, 04/02/2020.

Journal of Applied Physics, Volume 127, Issue 5, February 2020. The cage-like Li₃B₁₂ cluster that was predicted to possess high stability in a recent report [X. Dong et al., *Angew. Chem. Int. Ed.* 57, 4627 (2018)] was investigated as a candidate for hydrogen storage material within the density functional theory framework. Our computational results indicate that every Li atom in a Li₃B₁₂ cluster can at most attach six H₂ molecules, resulting in the gravimetric hydrogen uptake capacity of 24.8%. The binding energies of H₂ on clusters are in the range of 0.06–0.14 eV predicted with the wB97xD functional. Ab initio molecular dynamics simulations indicate that H₂ molecules are substantially attached by the host cluster at low temperature (77K) and can be efficiently released at room temperature (298K). Moreover, the adsorption and desorption kinetics of hydrogen molecules on the cluster can be adjusted by applying the external electric field.

[ver más...](#)

Magnetocaloric effect in Tb₂O₃ and Dy₂O₃ nanoparticles at cryogenic temperatures

Publicada en AIP Scitation, 03/02/2020.

Journal of Applied Physics, Volume 127, Issue 5, February 2020. Magnetic refrigeration is a cooling technology based on the magnetocaloric effect, which has greater energy efficiency than conventional refrigeration, and has attracted much attention for low and room temperature cooling applications. Here, we report magnetocaloric effects at cryogenic temperatures in nanostructured rare earth oxides prepared by rare earth nitride formation and successive oxidation that guarantees chemical stabilities and finer particle sizes of rare earth oxide nanoparticles. Tb₂O₃ and Dy₂O₃ rare earth oxides with a cubic structure were prepared that undergo a second-order magnetic transition at Néel temperatures of 8K and 4K, respectively. Magnetic entropy changes (SM) were 6.6 and 18.2J/kgK, respectively, at an applied magnetic field of 6T.

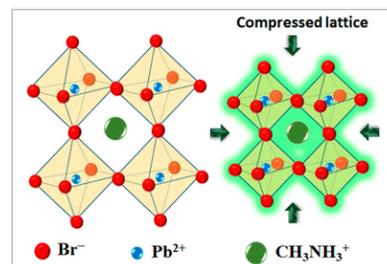
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Permanent Lattice Compression of Lead-Halide Perovskite for Persistently Enhanced Optoelectronic Properties

Publicada en ACS Energy Letters, 31/01/2020.

Under mild mechanical pressure, halide perovskites show enhanced optoelectronic properties. However, these improvements are reversible upon decompression, and permanent enhancements have yet to be realized. Here, we report antisolvent-assisted solvent acidolysis crystallization that enables us to prepare methylammonium lead bromide single crystals showing intense emission at all four edges under ultraviolet light excitation. We study structural variations (edge-vs-center) in these crystals using micro-X-ray diffraction and find that the enhanced emission at the edges correlates with lattice compression compared to in the central areas. Time-resolved photoluminescence measurements show much longer-lived photogenerated carriers at the compressed edges, with radiative component lifetimes of 1.4 s, 10 times longer than at the central regions.

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Metal–Organic Framework-Based Materials for Energy Conversion and Storage

Publicada en ACS Energy Letters, 23/01/2020.

Metal–organic frameworks (MOFs) have emerged as desirable cross-functional platforms for electrochemical and photochemical energy conversion and storage (ECS) systems owing to their highly ordered and tunable compositions and structures. In this Review, we present engineering principles promoting the electro-/photochemical performance of MOF-based materials for ECS by component design and nanostructuring.



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In situ x-ray photoelectron spectroscopy study of lithium carbonate removal from garnet-type solid-state electrolyte using ultra high vacuum techniques

Publicada en AIP Scitation, 20/01/2020.

Journal of Vacuum Science & Technology A, Volume 38, Issue 2, March 2020. Solid-state electrolytes (SSEs) are of significant interest for their promise as lithium ion conducting materials but are prone to degradation due to lithium carbonate formation on the surface upon exposure to atmosphere, adversely impacting Li ion conduction. In situ x-ray photoelectron spectroscopy monitored changes in the composition of the SSE Li garnet [Li_{6.5}La₃Zr_{1.5}Ta_{0.5}O₁₂ (LLZTaO)] upon annealing in ultrahigh vacuum (UHV) and upon Ar⁺ ion sputtering.

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A kinetic Monte Carlo-blueprint for oxygen reduction on oxide-supported PtNi nanoalloys

Publicada en AIP Scitation, 16/01/2020.

The Journal of Chemical Physics, Volume 152, Issue 3, January 2020. To elucidate the effect of the architecture of supported bimetallic nanocatalysts, we developed a new lattice kinetic Monte Carlo based on the classifying and counting adsorption sites with respect to their generalized coordination number. We employed this tool to estimate the activity of MgO-supported PtNi nanoalloys for oxygen reduction. We demonstrated that the presence of Ni atoms in contact with the substrate massively enhances their activity with at least a 7-order of magnitude increase in the turnover of water production with respect to the case where only Pt lay at the interface. We further discussed how the nanoalloy shape affects the activity showing that truncated octahedra are 102 more active than cuboctahedra of similar size. We explained our results in terms of their distinct distribution and occurrence of the most active sites for oxygen reduction leading to the stabilization of different chemical species during the reaction dynamics.

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Proportional integrator (PI) and fuzzy-controlled energy storage for zero-power flow between grid and local network with photovoltaic system

Publicada en Sustainable Energy Technologies and Assessments, 16/01/2020.

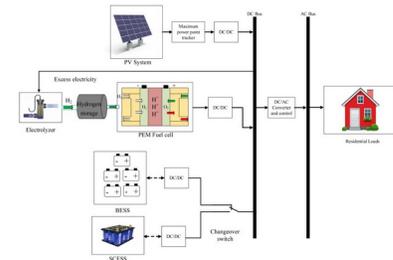
Publication date: February 2020 Source: Sustainable Energy Technologies and Assessments, Volume 37 Author(s): Yun Seng Lim, Jianhui Wong, Miao San Serena Liew, Lin Yi Ace Khaw Abstract Customer-sited photovoltaic (PV) systems have grown extensively due to a number of incentives offered by governments in the past. However, customers would choose to be 100% self-sufficient by consuming all solar electricity from their PV systems on-site if the selling price of the solar electricity is no longer attractive, which means that a zero-power flow between the grid and the local network with photovoltaic systems will likely be the preferred option to them. This paper highlights the feasibility of using the PI and fuzzy controllers on energy storage systems to achieve zero-power flow between the grid and the local network at all times. The performances of the two controllers are verified experimentally. The PI controller is able to achieve a more ideal zero-power flow than the fuzzy controller. However, the fuzzy controller is able to create a more stable power flow than the PI controller under vigorous intermittency of PV power outputs.

[ver más...](#)

Grid-independent PV system hybridization with fuel cell-battery/supercapacitor: Optimum sizing and comparative techno-economic analysis

Publicada en Sustainable Energy Technologies and Assessments, 12/01/2020.

Publication date: February 2020 Source: Sustainable Energy Technologies and Assessments, Volume 37 Author(s): Om Krishan, Sathans Suhag Abstract In this paper, a comparative techno-economic assessment of two different hybrid energy storage system configurations viz. fuel cell-battery energy storage system (FC-BESS) and fuel cell-supercapacitor energy storage system (FC-SCESS), incorporated in a grid-independent photovoltaic (PV) based power system for a residential building is performed. Firstly, load for the residential building is calculated and accordingly optimum sizing of various constituents of the PV system is obtained using HOMER.



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Fractional-order electric double-layer capacitors with tunable low-frequency impedance phase angle and energy storage capabilities

Publicada en AIP Scitation, 06/01/2020.

Applied Physics Letters, Volume 116, Issue 1, January 2020. In this study, we report the electrical response of two sets of solid-state fractional-order electrochemical capacitors for which the low-frequency impedance phase angle can be tuned from $[\text{math}]$ to $[\text{math}]$. The configuration makes use of a gel electrolyte in which carbonaceous additives (graphite or reduced graphene oxide) are dispersed at different proportions. Such a disordered electrolyte structure results in subdiffusive charge transport and thus a frequency dispersive capacitive-resistive behavior typical of a constant phase element, which can be useful for both frequency applications and energy storage purposes.

[ver más...](#)

Effects of wall superheat and mass flux on flow film boiling in cryogenic chilldown process

Publicada en AIP Scitation, 01/01/2020.

AIP Advances, Volume 10, Issue 1, January 2020. Chilldown process is usually the initial operation for storing and transporting cryogenic fluids. During this process, film boiling is of great importance in terms of the large time span. In this research, a numerical model was built to study the flow regime and heat transfer characteristics of the film boiling with cryogenic fluids. An algebraic interface area density framework was coupled in the model to calculate the drag force at the liquid-gas interface. Accordingly, the effects of wall superheat and mass flow rate on heat flux and film thickness were investigated. Furthermore, the variance analysis method was employed to evaluate the weight of the effects of superheat and inlet mass flow and their coupling effect on the heat transfer coefficient. The results reveal that the wall superheat effect prevails over the mass flux effect on the heat transfer coefficient. Moreover, the two factors have a relatively weak coupling impact on the heat transfer coefficient. Finally, the features of pressure drop in the tube were further analyzed.

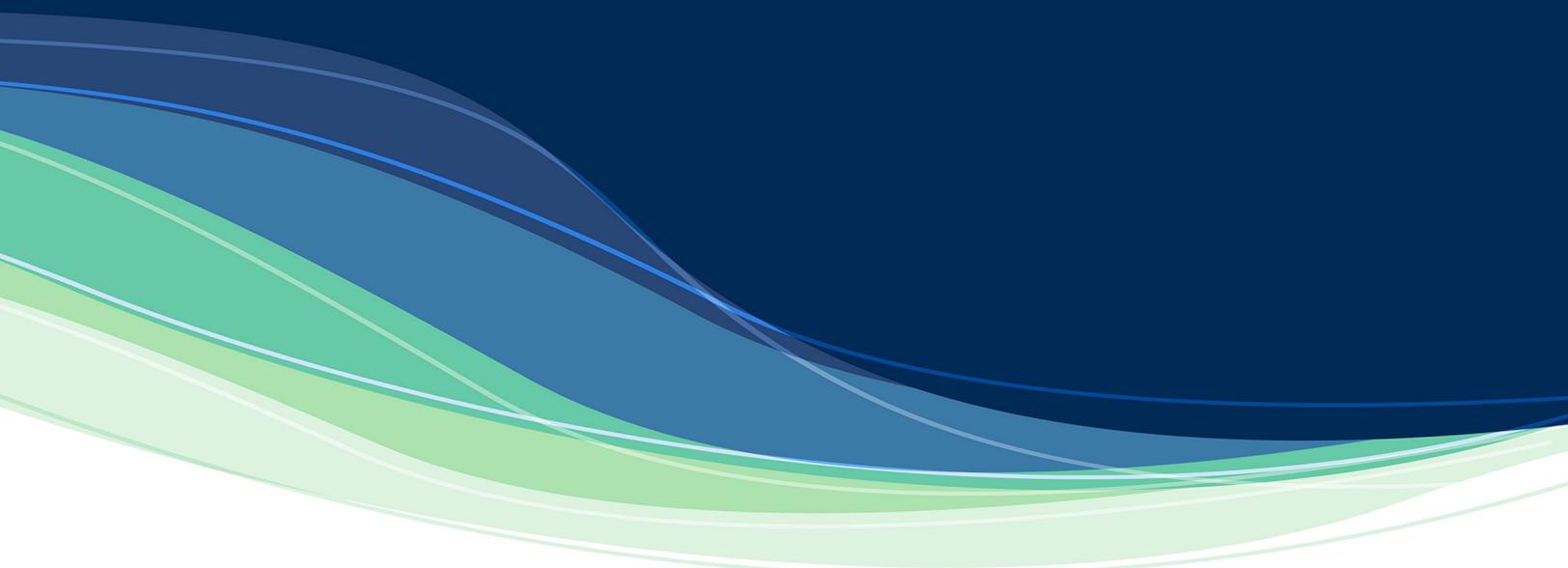
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Thermal annealing induced enhancement of room temperature magnetic memory effect in Fe-doped NiO nanoparticles

Publicada en AIP Scitation, 01/01/2020.

AIP Advances, Volume 10, Issue 1, January 2020. We report room temperature (RT) ferromagnetism and magnetic memory effect in $\text{Ni}_{0.95}\text{Fe}_{0.05}\text{O}$ nanoparticles (NPs) synthesized by hydrothermal method followed by post-annealing in an ambient atmosphere. The temperature and time-dependent magnetization measurements show that the effect of post-annealing at higher temperatures leads to enhancement in the intraparticle interactions. The enhanced intraparticle interaction has provided additional magnetic anisotropy energy resulting in RT ferromagnetic (FM) properties and enhanced magnetic memory effect. The findings from this study will be useful for the development and understanding of RT FM materials to facilitate the integration of spintronic devices.

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