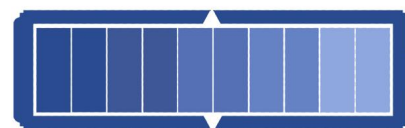


BOLETÍN DE VIGILANCIA TECNOLÓGICA E INTELIGENCIA COMPETITIVA

ALMACENAMIENTO DE ENERGÍA

JULIO - AGOSTO 2020



BATTERYPLAT

ÍNDICE

NOTICIAS

1. Energy storage will fundamentally change the energy landscape	2
2. Energy storage included in majority of winning bids in Portugal's 'record-b...	2
3. SET-Plan 10 Key Actions Batteries for e-Mobility and Stationary Storage (on...	3
4. Faster, more efficient energy storage could stem from holistic study of lay...	3
5. Las baterías de litio-hierro-fosfato superarán a las de litio-manganeso-cob...	4
6. Guidehouse: Energy storage to support electric vehicle charging could reach...	4
7. The ICMAB receives one ERC Proof of Concept grant to develop organic thermo...	5
8. Hydrogen generation in Europe Overview of costs and key benefits	5
9. Powering a climate-neutral economy: An EU Strategy for Energy System Integr...	6

EMPRESAS Y MERCADOS

10. Electric Car Sales Rise In Italy In July 2020 As New Incentives Loom	7
11. Batteries Will Reach \$100/kWh In 2024, According To Wood Mackenzie	7
12. TerraPower and GE Hitachi Nuclear Energy Introduce Commercial Natrium™ Powe...	8
13. New EV Makers In China Introduce Battery Swappable Models	8
14. European EV And PHEV Combined Sales Surpass China Thus Far In 2020	9
15. Madrid Orders More BYD Electric Buses	9
16. Tesla Giga Berlin Construction Speed Is Ultra High	10
17. Sungrow launches high voltage LFP energy storage solution at China solar tr...	10

PATENTES

18. US20200271106 Mounting frame, energy storage unit, pitch system, wind turbi...	11
19. US20200273632 High temperature energy storage device	11
20. US20200274370 Charging circuit and charging method for an electrical energy...	12
21. IN201817047909 Method and apparatus for bidirectional storage and renewable...	12
22. IN202017011917 Systems and methods for management of cryogenic storage vess...	13
23. IN202041031917 Magnetic resonance coupling wireless power transfer unit for...	13
24. US20200263830 A Thermal Storage Apparatus for a Compressed Gas Energy Stora...	14

ÍNDICE

25. US20200265350 Estimating capacity and usage pattern of behind-the-meter ene...	14
26. US20200266007 Electrochemical energy storage device	15
27. US20200266425 Redox and ion-adsorption electrodes and energy storage device...	15
28. US20200266508 Marine energy storage unit and a method to prevent thermal ru...	16
29. WO2020163894 Hydrogen based renewable energy storage system	16
30. WO2020166763 Method for increasing reversible capacity of anode electrode m...	17
31. US20200254887 Scaled home energy storage systems and associated uses	17
32. US20200254888 System And Method Of Hybrid Fast Electric Vehicle Charging Ut...	18
33. US20200255453 Energy storage molecular material, crystal dielectric layer a...	19
34. US20200256513 Cryogenic liquid tank	20
35. US20200259325 Rapid Short-Circuit Protection Circuit of Charger at Output E...	20
36. US20200259330 Energy storage system with string balance function	21
37. WO2020160670 Accumulator over-pressurization in a hydrostatically compensat...	21
38. WO2020160681 Methods and systems for storing thermal energy in a compressed...	22
39. IN201811031209 Green synthesized tio2 nanofluid for enhanced thermal storag...	22
40. US20200246953 Fastener-driving tool having a superconductor power source	23
41. US20200248057 Latent heat storage material, cold storage pack, cooling cont...	23
42. US20200248971 High temperature thermochemical energy storage system	24
43. WO2020158941 Heat storage device, power generation plant, and operation con...	25
44. WO2020159216 Greenhouse provided with underground thermal storage spatial s...	25
45. RU0002729039 Combined ice melting system and load curve smoothing using ene...	26
46. RU0002729040 Cryogenic piezoelectric generator	26
47. IN300870987 System for thermal response enhancement of phase change materia...	27
48. IN300871183 Compressed air - three stage recovery system	28
49. US20200243813 Compact battery-based energy storage	28
50. US20200243921 Electrical Energy Store and Method for Identifying a Storage ...	29
51. WO2020151060 Virtual shaft-type magnetic levitation flywheel energy storage...	29
52. WO2020152422 Electrical energy storage device for a motor vehicle	30
53. WO2020153896 Method and system for storing electrical energy in the form o...	30
54. US20200229668 Robotic Device With Energy Storage Device	31

ÍNDICE

55. US20200229949 Ankle prosthesis hydraulic drive circuit for achieving dampin...	32
56. US20200235582 Modular energy storage direct converter system	32
57. US20200225005 Energy Dense Source for Pulse Power Applications and Novel El...	33
58. WO2020143175 Battery pack, vehicle, and energy storage device	34
59. US20200220225 Device for electropolishing an energy storage device comprisi...	34
60. US20200208614 Coiled and twisted nanofiber yarns for electrochemically harv...	35
61. US20200212843 Magnetically pumped voltage controlled oscillator	35

PUBLICACIONES CIENTÍFICAS

62. Plasmonics beyond noble metals: Exploiting phase and compositional changes ...	37
63. Prediction of the electron kinetics relevant for CO ₂ splitting using in sit...	38
64. Lead-free antiferroelectric AgNbO ₃ : Phase transitions and structure enginee...	38
65. Dynamic evolution of thermally induced element distribution in nitrogen mod...	39
66. Development of eco-sustainable plasters with thermal energy storage capabil...	40
67. Improving the performance of phase-change memory by grain refinement	40
68. Coupled optical and thermal analyses of a new type of solar water heaters u...	41
69. Preparation and characterization of nanoencapsulated synthetic soybean oil ...	42
70. Granular superconductors for high kinetic inductance and low loss quantum d...	42
71. Effect of physical and geometrical parameters on vertical magnetic stiffnes...	43
72. Replication Data for: A Field Experiment on Workplace Norms and Electric Ve...	43
73. Combining wind, solar, and in-stream tidal electricity generation with ener...	44
74. Negative Thermal Quenching in FASn ₃ Perovskite Single Crystals ...	44
75. Reversible Room-Temperature Fluoride-Ion Insertion in a Tunnel-Structured T...	45

NOTICIAS

Energy storage will fundamentally change the energy landscape

Publicada en <https://batteryinnovation.org>, 28/08/2020.

This week, the CBI team attended ESACon20, the first virtual conference on our calendars since the COVID-19 pandemic began.

Organized by the US Energy Storage Association, the move online did not disappoint. With keynotes from the US Department of Energy and exhibitors from across the energy storage sector engaging in interactive discussion via live booths and networking lounges, the outcomes of the event were clear: the demand for clean, renewable energy storage is continuing to soar, and a range of technologies are needed to fulfil this clean energy transition.



[ver más...](#)

Energy storage included in majority of winning bids in Portugal's 'record-breaking' solar auction

Publicada en Energy Storage news, 27/08/2020.

Portugal's second solar auction has closed with record-breaking low prices of €11.14/MWh (US\$13.12), or US\$0.0131/kWh, the country's government announced yesterday. Of the 700MW available for auction, 670MW was awarded, with Hanwha Q CELLS winning half of the 12 lots with bids that included battery storage. Other winners included Tag Energy, Iberdrola and Enel, with the majority of the lots including battery storage.

[ver más...](#)

SET-Plan 10 Key Actions Batteries for e-Mobility and Stationary Storage (ongoing work)

Publicada en <https://setis.ec.europa.eu>, 27/08/2020.

In May 2016, the public consultation process was dedicated to the 4th Energy Union Research, Innovation and Competitiveness common priority, for "more sustainable transport systems that develop and deploy at large scale innovative technologies and services to increase energy efficiency and reduce greenhouse gas emissions". This time, it focused on Action 7 of the SET Plan Communication (C(2015)6317)



[ver más...](#)

Faster, more efficient energy storage could stem from holistic study of layered materials

Publicada en Eurekalert technology & engineering, 25/08/2020.

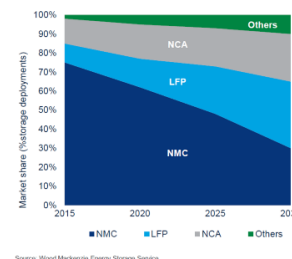
(DOE/Oak Ridge National Laboratory) A team led by Oak Ridge National Laboratory developed a novel, integrated approach to track energy-transporting ions within an ultra-thin material, which could unlock its energy storage potential leading toward faster charging, longer lasting devices.

[ver más...](#)

Las baterías de litio-hierro-fosfato superarán a las de litio-manganeso-cobalto como química de almacenamiento estacionario dominante para 2030

Publicada en <https://elperiodicodelaenergia.com>, 19/08/2020.

El litio-hierro-fosfato (LFP) está preparado para superar al litio-manganeso-cobalto-óxido (NMC) como la química de almacenamiento estacionario dominante a finales de esta década, creciendo del 10% del mercado en 2015 a más del 30% en 2030, según un nuevo análisis de Wood Mackenzie.



[ver más...](#)

Guidehouse: Energy storage to support electric vehicle charging could reach 1,900MW by 2029

Publicada en Energy Storage news, 04/08/2020.

Stationary energy storage in support of electric vehicles (EVs) charging could reach a global installed capacity of 1,900MW by the end of 2029 according to a new Guidehouse Insights report.

[ver más...](#)

The ICMAB receives one ERC Proof of Concept grant to develop organic thermoelectric based self-powered sensors

Publicada en <https://icmab.es>, 28/07/2020.

Mariano Campoy-Quiles, researcher at the Nanostructured Materials for Optoelectronics and Energy Harvesting (NANOPTO) group has been granted with an ERC Proof of Concept (PoC) to advance in the development of organic thermoelectric generators to power low-cost sensors for vineyards. Fifty-five grantees of the European Research Council (ERC) have been awarded Proof of Concept funding to explore the commercial or societal potential of their research results. The grants are part of the EU's research and innovation programme, Horizon 2020.



[ver más...](#)

Hydrogen generation in Europe Overview of costs and key benefits

Publicada en <https://op.europa.eu>, 08/07/2020.

The European Commission published its hydrogen strategy for a climate-neutral Europe on the 8th July 2020. This strategy brings different strands of policy action together, covering the entire value chain, as well as the industrial, market and infrastructure angles together with the research and innovation perspective and the international dimension, in order to create an enabling environment to scale up hydrogen supply and demand for a climate-neutral economy.



[ver más...](#)

Powering a climate-neutral economy: An EU Strategy for Energy System Integration

Publicada en <https://ec.europa.eu>, 08/07/2020.

Communication from the commission to the european parliament, the council, the european economic and social committee and the committee of the regions. Brussels, 8.7.2020 COM(2020) 299 fina



[ver más...](#)

EMPRESAS Y MERCADOS

Electric Car Sales Rise In Italy In July 2020 As New Incentives Loom

Publicada en Inside EVS, 30/08/2020.

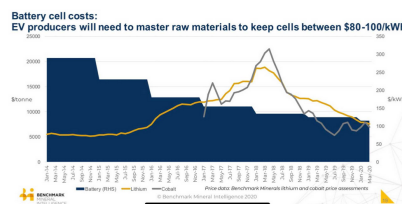
Summer continues with a strong growth trend for the Italian EV market. With the broader car industry now in recovery mode as the coronavirus pandemic falls under control, and ahead of enhanced EV incentives recently passed by Italy's government, July monthly car sales figures paint a well known picture of steady growth for electric mobility.

[ver más...](#)

Batteries Will Reach \$100/kWh In 2024, According To Wood Mackenzie

Publicada en Inside EVS, 28/08/2020.

EV advocates long for the day in which people will be able to decide which car to buy not based on price, but on what each vehicle has to offer. Many predictions have been made to date, but the most optimistic just came from Wood Mackenzie. According to the consulting company, battery prices will get below \$100/kWh in 2024.



[ver más...](#)

TerraPower and GE Hitachi Nuclear Energy Introduce Commercial Natrium™ Power Production and Storage System

Publicada en <https://www.terrapower.com>, 27/08/2020.

New Technology Improves the Economics of One of the Fastest and Lowest-Cost Paths to Carbon-Free Advanced Nuclear. Bellevue, Wash. – Aug. 27, 2020 – TerraPower and GE Hitachi Nuclear Energy (GEH) announced today the launch of the Natrium™ reactor and energy system architecture. This advanced nuclear technology features a cost-competitive sodium fast reactor combined with a molten salt energy storage system. Building on the technology used in solar thermal generation, Natrium energy storage and flexible power production will offer abundant clean energy in time to help meet climate goals.

[ver más...](#)

New EV Makers In China Introduce Battery Swappable Models

Publicada en Inside EVS, 26/08/2020.

Is that because of the available subsidies? According to a new report from China (via Moneyball), SAIC emerged on the Ministry of Industry and Information Technology (MIIT) subsidy approval list, with two new electric cars capable of battery swapping.

[ver más...](#)

European EV And PHEV Combined Sales Surpass China Thus Far In 2020

Publicada en Inside EVS, 21/08/2020.

And keep in mind that this is only Western Europe, because across the rest of the continent, electrified vehicle sales are still insignificant. China became the world's largest market for electrified vehicles back in 2018 when a total of 1.2-million EVs and PHEVs were sold in one year. And it looked like it would increase its lead, yet now it has apparently been overtaken by Europe, at least in the first months of 2020.

[ver más...](#)

Madrid Orders More BYD Electric Buses

Publicada en Inside EVS, 19/08/2020.

After successful operation of the first 15 units, the city wants more BYDs. This week, BYD delivered another fleet of electric buses in Europe. 15 new 12-meter eBuses were handed over to the Municipal Transport Company of Madrid (EMT Madrid) in Spain.



[ver más...](#)

Tesla Giga Berlin Construction Speed Is Ultra High

Publicada en Inside EVS, 18/08/2020.

Wall and roof construction are well advanced and progressing surprisingly fast. The latest video reports from Tesla Gigafactory 4 (aka Giga Berlin) in Grünheide near Berlin in Germany, reveals that the construction work is progressing at an ultra-high pace.

[ver más...](#)

Sungrow launches high voltage LFP energy storage solution at China solar trade show SNEC

Publicada en Energy Storage news, 13/08/2020.

Solar PV inverter supplier Sungrow debuted its latest 1500V lithium iron phosphate (LFP) lithium-ion energy storage solution at trade show SNEC, held in Shanghai, China.



[ver más...](#)

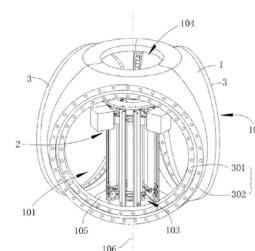
PATENTES

US20200271106 Mounting frame, energy storage unit, pitch system, wind turbine and method

Publicada en Tecnologías asociadas a almacenamiento de energía, 26/08/2020.

Solicitantes: BEIJING GOLDWIND SCIENCE & CREATION WINDPOWER EQUIPMENT CO., LTD.

The disclosure relates to a mounting frame, an energy storage unit, a pitch system, a wind turbine and a method. The mounting frame for mounting accumulators in a hub includes: a base having a predetermined thickness, wherein the base includes a mounting surface in a thickness direction of the base; and two or more accumulator mounting elements disposed on the mounting surface at intervals, wherein each accumulator mounting element includes a supporting assembly and a holding assembly connected to the supporting assembly, the supporting assembly is connected to the mounting surface and extends in the thickness direction, and the holding assembly is adapted to clamp and fix the accumulator such that all the accumulators in the hub are mounted to the mounting frame.



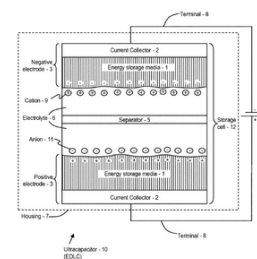
[ver más...](#)

US20200273632 High temperature energy storage device

Publicada en Tecnologías asociadas a almacenamiento de energía, 26/08/2020.

Solicitante: FASTCAP SYSTEMS CORPORATION

An ultracapacitor that includes an energy storage cell immersed in an electrolyte and disposed within an hermetically sealed housing, the cell electrically coupled to a positive contact and a negative contact, wherein the ultracapacitor is configured to output electrical energy within a temperature range between about 80 degrees Celsius to about 210 degrees Celsius. Methods of fabrication and use are provided.



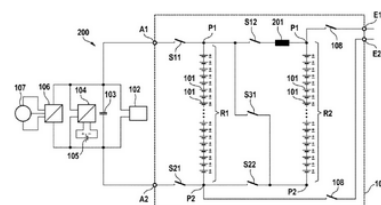
[ver más...](#)

US20200274370 Charging circuit and charging method for an electrical energy storage system

Publicada en Tecnologías asociadas a almacenamiento de energía, 26/08/2020.

Solicitante: Robert Bosch GmbH

The invention relates to a charging circuit (200) for an electrical energy storage system (100) having n electrical energy storage units ($R1$, $R2$). The charging circuit (200) comprises at least a first input ($E1$) and a second input ($E2$) for electrically connecting to an energy source, at least a first output ($A1$) and a second output ($A2$), and at least n first pole connections ($P1$) and n second pole connections ($P2$), wherein the pole connections can be connected in an electrically conductive manner to corresponding pole connections of the electrical energy storage units.



[ver más...](#)

IN201817047909 Method and apparatus for bidirectional storage and renewable power converter

Publicada en Tecnologías asociadas a almacenamiento de energía, 20/08/2020.

Solicitante: DYNAPOWER COMPANY LLC

An energy storage system for renewable energy applications includes a renewable energy source a bidirectional inverter connected an AC bus and a DC bus an energy storage unit connected to the bidirectional DC/DC converter and a control system comprising one or more controllers coupled to the bidirectional inverter and the bidirectional DC/DC converter. The bidirectional inverter is connected to the renewable energy source and a bidirectional DC/DC converter through the DC bus. The control system is configured to facilitate the operation of the bidirectional DC/DC converter and the bidirectional inverter.

[ver más...](#)

IN202017011917 Systems and methods for management of cryogenic storage vessels

Publicada en Tecnologías asociadas a almacenamiento de energía, 20/08/2020.

Solicitante: WORTHINGTON INDUSTRIES, INC.

Dual level sensing, vacuum monitoring, smart supply cylinders, smart oxygen monitors, and real time data collection functionality are integrated with a cryogenic storage system to improve sample safety and user safety. The dual level sensing system includes two liquid nitrogen level sensors installed into a cryogenic freezer that send redundant level information to a controller. Vacuum monitoring is performed via a gauge, installed on a vacuum port, that communicates data to the controller. The controller further receives level information from supply cylinders and oxygen levels from one or more oxygen monitors.

[ver más...](#)

IN202041031917 Magnetic resonance coupling wireless power transfer unit for implantable biomedical devices

Publicada en Tecnologías asociadas a baterías, supercapacitadores, supercondensadores, acumuladores, 20/08/2020.

Solicitantes: RAMAKRISHNA YARLAGADDA

Wireless power distribution based magnetic resonance affords an inoffensive way to control biocompatible medical applications. The wireless power transmission system will eradicate the cable linking while the transmission of electric power. Wireless Power Transfer (WPT) technology is still used as it significantly contributes to the batteries as a source of energy which decreases the diameter of the console directly and requires the device to be mounted in a confined area inside the human body. It lowers certain surgical expenses, the possibility of health problems and prevents from frequent battery reconstructive surgery.

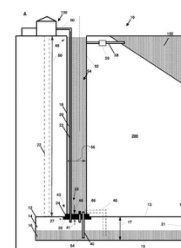
[ver más...](#)

US20200263830 A Thermal Storage Apparatus for a Compressed Gas Energy Storage System

Publicada en Tecnologías asociadas a almacenamiento de energía, 19/08/2020.

Solicitante: Hydrostor Inc.

A thermal storage subsystem may include at least a first storage reservoir disposed at least partially under ground configured to contain a thermal storage liquid at a storage pressure that is greater than atmospheric pressure. A liquid passage may have an inlet connectable to a thermal storage liquid source and configured to convey the thermal storage liquid to the liquid reservoir.



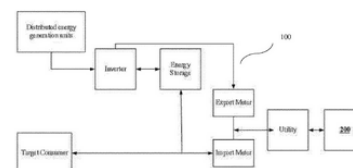
[ver más...](#)

US20200265350 Estimating capacity and usage pattern of behind-the-meter energy storage in electric networks

Publicada en Tecnologías asociadas a almacenamiento de energía, 19/08/2020.

Solicitante: Tata Consultancy Services Limited

The present disclosure provides a method and a system for estimating capacity and usage pattern of behind-the-meter energy storage in electric networks. Conventional techniques on estimating an effective capacity of behind-the-meter energy storage of a consumer, in presence of distributed energy generation units is limited, computationally intensive and provide inaccurate prediction. The present disclosure provides an accurate estimate of the effective capacity and usage pattern of behind-the-meter energy storage of a target consumer utilizing data samples received from a utility in presence of one or more distributed energy generation units, using an energy balance equation with less computation and accurate prediction.



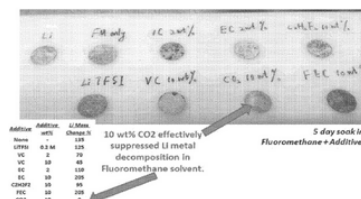
[ver más...](#)

US20200266007 Electrochemical energy storage device

Publicada en Tecnologías asociadas a almacenamiento de energía, 19/08/2020.

Solicitante: The Regents of the University of California

Electrochemical energy storage devices utilize ionic conducting electrolyte solution to carry charge between positive and negative electrodes. The electrolyte solutions use a mixture of solvent and salt and additional components, or additives, for improved electrochemical stability of the device. In an exemplary embodiment, an electrochemical device includes an electrolyte and housing to provide a pressurized condition for the electrolyte, and electrodes in contact with the electrolyte.



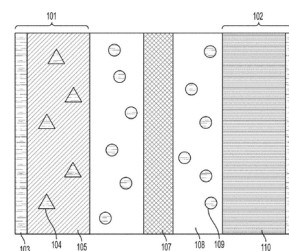
[ver más...](#)

US20200266425 Redox and ion-adsorption electrodes and energy storage devices

Publicada en Tecnologías asociadas a baterías, supercondensadores, supercondensadores, acumuladores, 19/08/2020.

Solicitante: The Regents of the University of California

Provided herein are energy storage devices comprising a first electrode comprising a layered double hydroxide, a conductive scaffold, and a first current collector; a second electrode comprising a hydroxide and a second current collector; a separator; and an electrolyte. In some embodiments, the specific combination of device chemistry, active materials, and electrolytes described herein form storage devices that operate at high voltage and exhibit the capacity of a battery and the power performance of supercapacitors in one device.



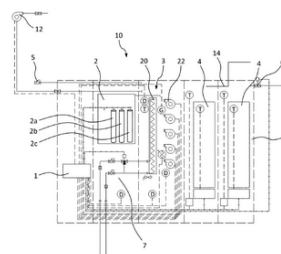
[ver más...](#)

US20200266508 Marine energy storage unit and a method to prevent thermal runaway in a marine energy storage unit

Publicada en Tecnologías asociadas a baterías, supercapacitadores, supercondensadores, acumuladores, 19/08/2020.

Solicitante: ROLLS-ROYCE MARINE AS

Marine energy storage unit with thermal runaway safety barriers to prevent cell temperature increase, said marine energy storage unit comprises at least one closed module cabinet (10) with a plurality of stacked battery cells (4) and an internal cooling system. The internal cooling system comprises an enclosed cabinet cooling circuit (3) with a water-to-air exchanger (20) for air cooling of the battery cells (4), and the water-to-air exchanger (20) is connected to a water-to-water heat exchanger (30) for receipt of water from an external source.



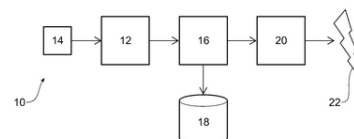
[ver más...](#)

WO2020163894 Hydrogen based renewable energy storage system

Publicada en Tecnologías asociadas a almacenamiento de energía, 19/08/2020.

Solicitante: GOMEZ, Rodolfo Antonio [AU]

A renewable energy storage system which uses hydrogen as a storage medium. The system comprises a hydrogen generation module for producing hydrogen through electrolysis of water wherein the hydrogen generation module is powered by one or more renewable energy sources and a hydrogen storage module for storing at least part of the hydrogen as compressed hydrogen or as hydrogen protons. The system further comprises a hydrogen fuel cell for converting at least part of the hydrogen stored to produce electricity.



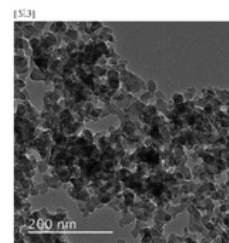
[ver más...](#)

WO2020166763 Method for increasing reversible capacity of anode electrode material for alkali-ion batteries

Publicada en Tecnologías asociadas a baterías, supercapacitadores, supercondensadores, acumuladores, 19/08/2020.

Solicitante: KOREA MARITIME UNIVERSITY INDUSTRY-ACADEMIC COOPERATION FOUNDATION [KR]

The present invention relates to a method for increasing the reversible capacity of an anode electrode material for alkali-ion batteries and, more specifically, to a method for increasing the reversible capacity of an anode electrode material for alkali-ion batteries, wherein, after synthesizing a carbon material in which the inside of carbon is doped by plasma with an alkali metal in a solution, the doped alkali metal is desorbed by an ether-based electrolyte to form new void spaces to maximize the storage capacity of the alkali metal, thereby allowing reversible capacity to be increased while compensating for Coulombic efficiency.



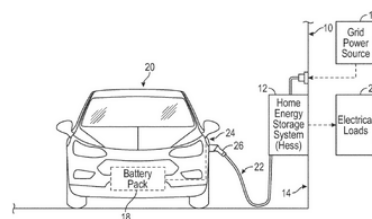
[ver más...](#)

US20200254887 Scaled home energy storage systems and associated uses

Publicada en Tecnologías asociadas a almacenamiento de energía, 12/08/2020.

Solicitante: FORD GLOBAL TECHNOLOGIES, LLC

This disclosure details exemplary home energy storage systems capable of storing electricity locally for later consumption, such as for charging an electrified vehicle, supporting various home energy needs, and supporting alternative energy storage/power source functionality. An exemplary home energy storage system may include a stationary unit, one or more modular units removably connectable to the stationary unit, and a rack mounting and handcart transportation system configured to mount, detach, and transport the modular unit relative to the stationary unit. Once undocked from the stationary unit, the modular unit(s) may be utilized as a portable power source for powering one or more electrical loads. This disclosure further describes various interconnected functionalities (e.g., electrical and wireless communication of state of uses)



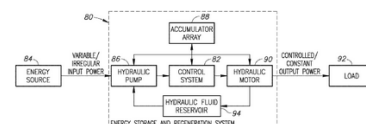
[ver más...](#)

US20200254888 System And Method Of Hybrid Fast Electric Vehicle Charging Utilizing Efficient Hydraulic Energy Storage And Regeneration

Publicada en Tecnologías asociadas a almacenamiento de energía, 12/08/2020.

Solicitante: Energy Spring Ltd.

A novel and useful hybrid fast charging system for electric vehicles incorporating an efficient hydraulic storage and regeneration system (ESRS) that converts irregular, non-constant, and variable input power to regular, constant, and controlled output power using hydraulics whereby the irregular input power is used to charge an accumulator array with high pressurized oil. Subsequently, energy is released rapidly in a controlled fashion using a hydraulic motor operated by the pressurized hydraulic fluid from the accumulator array, to power one or more fast charge circuits. The output mechanical power supplied is used to supply electricity to one or more EV charging stations.



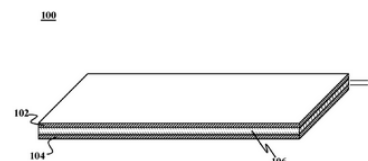
[ver más...](#)

US20200255453 Energy storage molecular material, crystal dielectric layer and capacitor

Publicada en Tecnologías asociadas a consumo y reciclaje de energía, 12/08/2020.

Solicitante: CAPACITOR SCIENCES INCORPORATED

The present disclosure provides an energy storage molecular material, crystal dielectric layer and capacitor which may solve a problem of the further increase of volumetric and mass density of reserved energy associated with some energy storage devices, and at the same time reduce cost of materials.



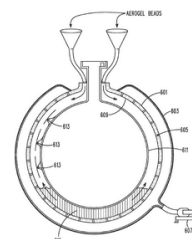
[ver más...](#)

US20200256513 Cryogenic liquid tank

Publicada en Tecnologías asociadas a almacenamiento de energía, 12/08/2020.

Solicitante: AeroVironment, Inc.

A hydrogen storage tank for a hydrogen fueled aircraft. The tank has a wall made of layers of aerogel sections around a hard shell layer, sealed within a flexible outer layer, and having the air removed to form a vacuum. The periphery of each layer section abuts other sections of that layer, but only overlies the periphery of the sections of other layers at individual points. The wall is characterized by a thermal conductivity that is lower near its gravitational top than its gravitational bottom. The tank has two exit passageways, one being direct, and the other passing through a vapor shield that extends through the wall between two layers of aerogel. A control system controls the relative flow through the two passages to regulate the boil-off rate of the tank.



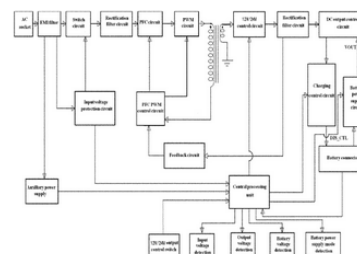
[ver más...](#)

US20200259325 Rapid Short-Circuit Protection Circuit of Charger at Output End and Battery Charger

Publicada en Tecnologías asociadas a baterías, supercapacitores, supercondensadores, acumuladores, 12/08/2020.

Solicitante: SHENZHEN CLICK TECHNOLOGY CO., LTD.; CLICK TECHNOLOGY (XINFENG) CO., LTD.; HUIZHOU CITY CLICK TECHNOLOGY CO., LTD.

Disclosed is a rapid short-circuit protection circuit of charger at output end. With the short-circuit protection circuit adopted at an output end of a battery charger, MOS switch transistors in a battery power supply circuit may not burn out when an output end VOUT of the battery charger is short-circuited, and thus a good short-circuit protection effect is rendered.



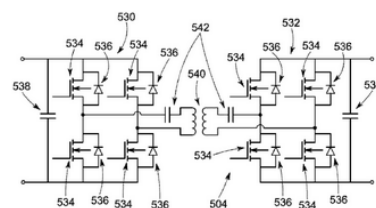
[ver más...](#)

US20200259330 Energy storage system with string balance function

Publicada en Tecnologías asociadas a almacenamiento de energía, 12/08/2020.

Solicitante: GENERAL ELECTRIC COMPANY

An energy storage system includes an energy storage device that has a plurality of cells. The energy storage system further includes a string power converter connected in series between the energy storage device and a direct current (DC) bus, and a plurality of cell power converters each connected across a respective one of the energy storage device cells.



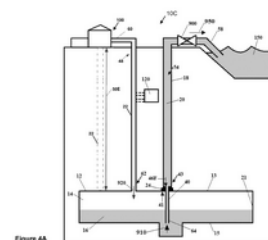
[ver más...](#)

WO2020160670 Accumulator over-pressurization in a hydrostatically compensated compressed air energy storage system

Publicada en Tecnologías asociadas a almacenamiento de energía, 12/08/2020.

Solicitante: HYDROSTOR INC. [CA]

A method of operating a hydrostatically compensated compressed air energy storage system in a first charging mode including conveying the compressed air at a nearly constant first operating pressure which displaces a corresponding volume of compensation liquid from the layer of compensation liquid out of the accumulator, and a second charging mode including conveying additional compressed air into the accumulator while compensation liquid is not displaced from within the accumulator so that the pressure of the layer of compressed air increases to a second operating pressure that is greater than the first operating pressure.



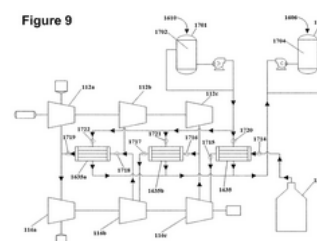
[ver más...](#)

WO2020160681 Methods and systems for storing thermal energy in a compressed gas energy storage system

Publicada en Tecnologías asociadas a almacenamiento de energía, 12/08/2020.

Solicitante: HYDROSTOR INC. [CA]

A compressed air energy storage system and method of temporarily storing thermal energy via a thermal storage subsystem in a compressed air energy storage system comprising an accumulator disposed underground and having an interior configured to contain compressed air at an accumulator pressure that is at least 20 bar and a three-stage gas compressor/expander subsystem in communication with the accumulator. The thermal storage subsystem comprises a thermal storage liquid, a heat exchanger for each stage of compression and expansion, and a pressurized thermal storage reservoir. In a charging mode, air is compressed by compressor, cooled by a heat exchanger, and stored in the accumulator while thermal energy from the air is stored in the thermal storage reservoir.



[ver más...](#)

IN201811031209 Green synthesized tio2 nanofluid for enhanced thermal storage capacity of (ch2oh)2

Publicada en Tecnologías asociadas a almacenamiento de energía, 06/08/2020.

Solicitante: SHOOLINI UNIVERSITY

In present invention TiO₂ nanoparticles are synthesized from neem leafs by green synthesis. Preparation of two solutions of TiO₂ based nanofluid with surfactant CTAB and without surfactant was done. Both the solutions were kept undisturbed for determining their stability on the bases of visual sedimentation. It was observed that TiO₂-(CH₂OH)₂ nanofluid prepared without surfactant has no visual sedimentation for 10 hours. Few mm layer has been observed at the bottom of the test tube. After 20 hours the particles were partially dispersed with sedimentation. On the other hand, TiO₂-(CH₂OH)₂ based nanofluid had showed visual sedimentation in just 3 hours. Hence TiO₂-(CH₂OH)₂ nanofluid without surfactant is more stable as compared to TiO₂ nanofluid prepared with surfactant (CTAB).

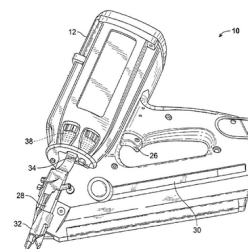
[ver más...](#)

US20200246953 Fastener-driving tool having a superconductor power source

Publicada en Tecnologías asociadas a baterías, supercapacitadores, supercondensadores, acumuladores, 05/08/2020.

Solicitante: Illinois Tool Works Inc.

The present disclosure provides various embodiments of a fastener-driving tool that includes a battery-charged supercapacitor as a power source. The fastener-driving tool includes first and second spaced-apart, conductive rails and a partially conductive piston slidably mounted on the rails. The rails and the piston are electrically connected to one another. The supercapacitor is electrically connected to the first rail. When the supercapacitor discharges electrical current, the electrical current flows from the supercapacitor, into the first rail, through the piston into the second rail, and from the second rail. The electrical current induces magnetic fields in the rails and the piston, and the combination of the electrical current and the magnetic fields induce a Lorentz force that acts on the piston to move the piston toward a nosepiece to drive a fastener.



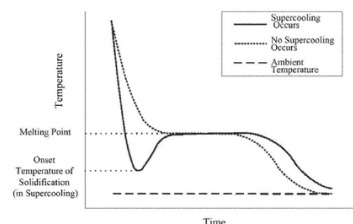
[ver más...](#)

US20200248057 Latent heat storage material, cold storage pack, cooling container, logistic packaging container, and cooling unit

Publicada en Tecnologías asociadas a baterías, supercapacitores, supercondensadores, acumuladores, 05/08/2020.

Solicitante: SHARP KABUSHIKI KAISHA

The present invention, in an embodiment thereof, provides a latent heat storage material containing a supercooling inhibitor that, if added to an aqueous solution of an inorganic salt including sodium chloride, restrains supercooling by unfailingly precipitating as crystals upon cooling and therefore only marginally lowers the melting point and reduces latent heat. The latent heat storage material contains: an aqueous solution of sodium chloride; and a eutectic aqueous solution of sodium chloride and disodium hydrogen phosphate in an amount that, in comparison with the eutectic aqueous solution of sodium chloride, is greater than or equal to an amount that gives a saturation concentration at 0° C.



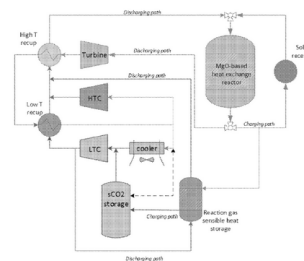
[ver más...](#)

US20200248971 High temperature thermochemical energy storage system

Publicada en Tecnologías asociadas a almacenamiento de energía, 05/08/2020.

Solicitante: Southern Research Institute

A thermochemical energy storage system and method of storing thermal energy are disclosed. The energy storing system described herein comprises a reactor comprising a CO₂ sorbent comprising MgO, and b) a supercritical CO₂ source, wherein the supercritical CO₂ source is in fluid communication with the reactor and the CO₂ sorbent comprising MgO to allow flow of supercritical CO₂ between the supercritical CO₂ source and the reactor, thereby allowing contact of CO₂ with the CO₂ sorbent comprising MgO.



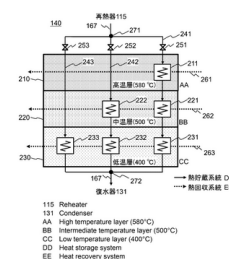
[ver más...](#)

WO2020158941 Heat storage device, power generation plant, and operation control method during fast cut back

Publicada en Tecnologías asociadas a almacenamiento de energía, 05/08/2020.

Solicitante: MITSUBISHI HITACHI POWER SYSTEMS, LTD. [JP]

Provided is technology to efficiently store and use, in a plurality of different temperature ranges, excess energy generated at a power generation plant. A heat storage device 140 that has a plurality of heat storage units to recover and accumulate heat from a fluid passing through a channel provided therein is characterized by comprising a first heat storage unit that has temperature characteristics in a first temperature range, ...



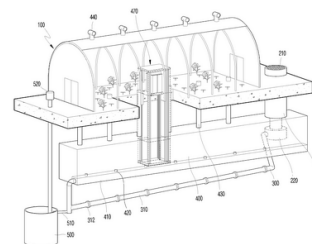
[ver más...](#)

WO2020159216 Greenhouse provided with underground thermal storage spatial structure

Publicada en Tecnologías asociadas a almacenamiento de energía, 05/08/2020.

Solicitantes: YOON, Young Hwan [KR]

The present invention relates to a greenhouse including an underground thermal storage spatial structure (400) which: is made of a concrete material and used as a heat storage body for geothermal energy by being buried underground in the form of a spatial structure, and is also utilized as a storage space for storing geothermally-exchanged outdoor air, or as a transportation space for transporting geothermally-exchanged outdoor air to the interior of the greenhouse; supplies heating air to the interior of the greenhouse during the winter season, and cooling air to the interior of the greenhouse during the summer season; and can even be utilized as a temporary rest area for workers or as an intermediate space for the shipment of crops.



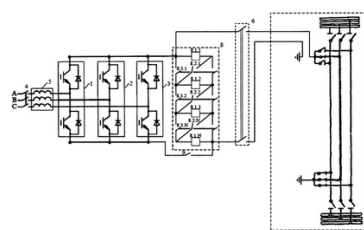
[ver más...](#)

RU0002729039 Combined ice melting system and load curve smoothing using energy accumulators based on storage batteries and high-power supercapacitors contained in an autonomous power plant

Publicada en Tecnologías asociadas a almacenamiento de energía, 03/08/2020.

Inventores: (RU) et al.

Invention can be used in electric engineering for ice melting on overhead power transmission lines. Plant comprises a three-phase bridge converter on fully controlled semiconductor gates, shunted by mutually connected diodes, a three-pole switch and a series-connected three-phase throttle, units of storage batteries or high-power supercapacitors (hereinafter – units), in the first case, used to smooth load graphs, in the second case –for ice melting, in the first case are closed by two-pole switches, forming one group of parallel connected units, in the second one – open, in the first case are connected by contacts of the single-pole switch with emitter and commutator outputs of the converter valves, in the second...

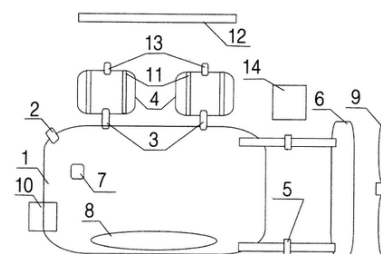


[ver más...](#)

RU0002729040 Cryogenic piezoelectric generator

Publicada en Tecnologías asociadas a almacenamiento de energía, 03/08/2020.

FIELD: electrical engineering. **SUBSTANCE:** cryogenic piezoelectric generator (CPG) has: a container for storage of cooled liquefied gas. By means of the valves controlled by the control unit, the tank is connected to resonator chambers (having valves for pressure release), in which there are piezoelectric elements. Piezoelectric elements react to changes in pressure in chambers by creation of potential difference at their contacts. Liquefied gas heating system controlled by control unit. Control unit capable of starting and stopping liquefied gas heating, controlling pressure in vessel. Also, valves are opened and closed in resonators for optimum process of current generation with preset parameters by piezoelectric elements. **EFFECT:** technical result consists in improvement of CPG and simplification of design. 3 cl, 1 dwg



[ver más...](#)

IN300870987 System for thermal response enhancement of phase change materials of energy storage and method thereof

Publicada en Tecnologías asociadas a almacenamiento de energía, 30/07/2020.

Solicitante: NATIONAL INSTITUTE OF TECHNOLOGY TIRUCHIRAPPALLI

The present invention relates to design and development of a heat exchanger containing phase change materials for thermal energy storage system. The present invention relates to a system for thermal response enhancement of phase change materials of energy storage system. The system for thermal response enhancement of phase change materials of the energy storage system comprises of a heat exchanger which is comprised of a shell [1], a helical coil [2], one or more inserts [3], an inlet of heat transfer fluid [4], an outlet of heat transfer fluid [5], a ferrule nut [6] and a housing [7]. Further the present invention relates to a method of heat transfer enhancement of phase change materials. Furthermore, this particular invention can be used for any phase change material in any temperature range of operation. FIGURE 1.

[ver más...](#)

IN300871183 Compressed air - three stage recovery system

Publicada en Tecnologías asociadas a almacenamiento de energía, 30/07/2020.

Solicitante: Nataraj M

The present invention is relates to the compressed air energy storage (CAES) and recovery system, where as in case CAES to recover the compressed air energy, air will be passed through the turbine by heating it with fossil fuel, but in this invention we are passing the compressed air in a water chamber with proper arrangement of vertical conveyor belt and wheel system. The vertical conveyor belt is fitted with collapsible pouches, which will hold the air, due to the buoyance of air, the belt system rotates and we can harness the energy by connecting it to the gear system, in turn to the generator to generate electric power.

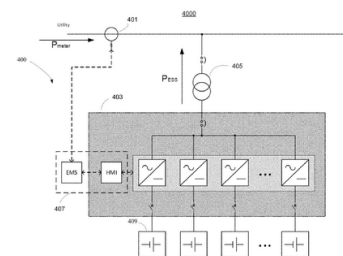
[ver más...](#)

US20200243813 Compact battery-based energy storage

Publicada en Tecnologías asociadas a almacenamiento de energía, 29/07/2020.

Solicitante: Sinexcel, Inc.

Compact battery-based energy storage systems are disclosed. An example battery-based energy storage device includes: an energy storage inverter; a transformer; a fire extinguisher system; a first battery chamber; a second battery chamber, and an air conditioner system that is configured to provide air conditioning to the first battery chamber and the second battery chamber. The first battery chamber and the second battery chamber are separated by a wall structure and each has its independent air conditioning. The dimensions of the battery-based energy storage device are substantially same as those of a standard 20 ft container. The first battery chamber, the second battery chamber, and the wall structure may equal to inner width of the battery-based energy storage. The battery-based energy storage device may also comprise a ventilation opening of battery set at a top of the first battery chamber and/or the second battery chamber.



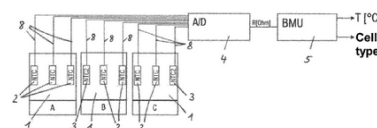
[ver más...](#)

US20200243921 Electrical Energy Store and Method for Identifying a Storage Module Type of an Electrical Energy Store

Publicada en Tecnologías asociadas a almacenamiento de energía, 29/07/2020.

Solicitante: Bayerische Motoren Werke Aktiengesellschaft

An electrical energy store has a plurality of storage modules, each of which has at least one temperature sensor string having a temperature sensor in the form of a temperature-dependent resistor for measuring the storage module temperature, and a battery control unit, which, based on the resistance values of the temperature sensor strings, determines the temperatures at the respective temperature sensors. The battery control unit is designed to determine a respective storage module type based on the measured resistance values of the temperature sensor strings.



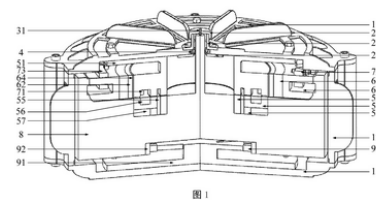
[ver más...](#)

WO2020151060 Virtual shaft-type magnetic levitation flywheel energy storage device for electric car

Publicada en Tecnologías asociadas a almacenamiento de energía, 29/07/2020.

Solicitante: JIANGSU UNIVERSITY [CN]

Disclosed is a virtual shaft-type magnetic levitation flywheel energy storage device for an electric car. A flywheel rotor has, sequentially from bottom to top, and being tightly fixedly connected and having the same outer diameter, a lower annular member, a main cylindrical member, an upper annular member, and a radial/torsion rotor yoke. A central cylindrical member is coaxially and fixedly connected at the exact center of an upper surface of the main cylindrical member, a top elongated cylindrical member is coaxially and fixedly connected at the exact center of an upper surface of the central cylindrical member, and an upper end of the top elongated cylindrical member extends upward and coaxially passes through a static portion of a magnetic bearing having five degrees of freedom. The lower annular member and the central cylindrical member are both solid circular disks.



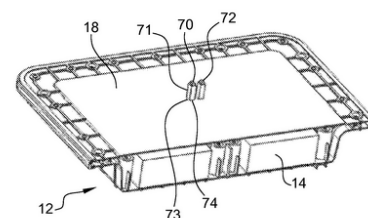
[ver más...](#)

WO2020152422 Electrical energy storage device for a motor vehicle

Publicada en Tecnologías asociadas a almacenamiento de energía, 29/07/2020.

Solicitante: VALEO SYSTEMES THERMIQUES [FR]

The invention relates to a compartment for an electrical energy storage device (16) for a motor vehicle, the compartment being arranged to receive at least one electrical energy storage cell (14), in particular a plurality of cells, this compartment being made, for example, at least partially of a composite material, in particular this composite material being formed by a multilayer structure comprising, for example, glass-fibre or carbon sheets, in particular impregnated with a thermoplastic resin, this compartment comprising a casing (12) and a cover (18) designed to close the casing, this cover comprising at least one electric track borne by the cover, the track (70) designed to be placed in electrical contact with at least one of the cells when the cover is mounted on the casing.



[ver más...](#)

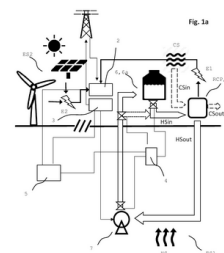
WO2020153896 Method and system for storing electrical energy in the form of heat and producing a power output using said heat

Publicada en Tecnologías asociadas a almacenamiento de energía, 29/07/2020.

Solicitante: CLIMEON AB [SE]

The invention relates to a system for storing heat energy and generating a power output in the form of electricity using the heat. The energy system comprising a heat power module (1) operating in accordance with a thermodynamic closed loop cycle process (RC) to generate a first power output (E1) from heat input (HSin) from a geothermal well, a receiver (2) for receiving the first power output (E1) and a second power output (E2) generated by at least one additional intermittent energy source (ES2) selected from solar photovoltaics, wind power, biogas electrification or other renewable energy source arranged to intermittently generate electricity.

[ver más...](#)



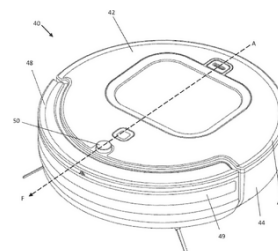
US20200229668 Robotic Device With Energy Storage Device

Publicada en Tecnologías asociadas a almacenamiento de energía, 22/07/2020.

Solicitantes: Graham BONE / Black & Decker, Inc.

A robotic device comprising: an energy storage device; and a controller configured to determine whether a quantity of energy stored in the energy storage device is below a predetermined energy level, wherein: the robotic device is configured to perform a cleaning task if the determined quantity of energy is not below the predetermined energy level; if the determined quantity of energy is below the predetermined energy level: the controller is configured to estimate a likelihood of the robotic device being capable of locating a recharging base station; and in dependence on the estimated likelihood, the robotic device is configured to seek the recharging base station or perform the cleaning task.

[ver más...](#)

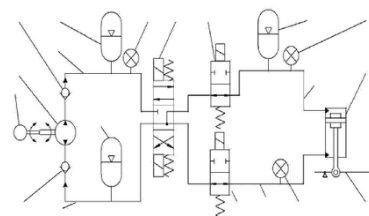


US20200229949 Ankle prosthesis hydraulic drive circuit for achieving damping control and energy recovery

Publicada en Tecnologías asociadas a consumo y reciclaje de energía, 22/07/2020.

Solicitante: Beihang University

The disclosure discloses an ankle prosthesis hydraulic drive circuit for achieving damping control and energy recovery, belonging to the technical field of prosthesiss and orthotic devices. The hydraulic drive circuit particularly includes a motor, a hydraulic pump, a first check valve, a first high-pressure energy accumulator, a three-position four-way valve, an electromagnetic normally-closed valve, a second high-pressure energy accumulator, a single-rod hydraulic cylinder, an electromagnetic normally-opened valve, a low-pressure energy accumulator, a second check valve, an oil inlet line, an oil outlet line, a first line and a second line. The hydraulic drive circuit provided by the disclosure is capable of outputting enough peak power to meet a normal walking demand, and meanwhile actively controlling the damping of the circuit and recycling energy during the walking.



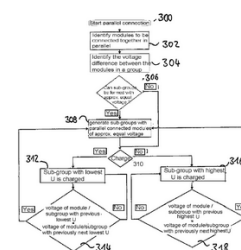
[ver más...](#)

US20200235582 Modular energy storage direct converter system

Publicada en Tecnologías asociadas a almacenamiento de energía, 22/07/2020.

Solicitante: Universitaet der Bundeswehr Muenchen

Invention describes a modular energy storage direct converter system (10) which comprises the following: a control device (20) and at least one bridge branch (12) which comprises The a plurality of modules (14) which are connected in series, wherein each of said modules (14) comprises a storage element for electrical energy, in particular a battery, or an energy conversion element. Said modules (14) are designed and can be actuated such that the storage element or energy conversion element of a module can be selectively deactivated, and that the storage elements or energy conversion elements of two modules, which are separated by at least one intermediate module with a deactivated storage element/energy conversion element, can be connected selectively in parallel and in series.



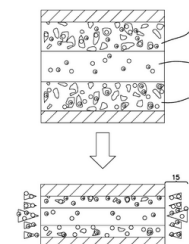
[ver más...](#)

US20200225005 Energy Dense Source for Pulse Power Applications and Novel Electromagnetic Armor

Publicada en Tecnologías asociadas a consumo y reciclaje de energía, 15/07/2020.

Solicitante: Battelle Memorial Institute

A supercapacitor-like device is described that uses a porous, conductive foam as the electrodes. After the device is charged, an explosive wave front can be used to remove electrolyte from the metal foam. This creates a large net charge on each electrode, which will readily flow through a load placed across the electrodes. The removal of charge can potentially occur on a time scale of microseconds, allowing a supercapacitor to be used in pulsed power applications. The creation of this net charge requires significant energy, meaning this concept may also be suitable for removing kinetic energy from objects.



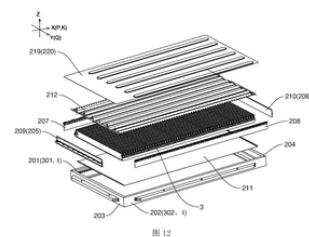
[ver más...](#)

WO2020143175 Battery pack, vehicle, and energy storage device

Publicada en Tecnologías asociadas a baterías para transporte, 15/07/2020.

Solicitante: TSINGYIHUA INTELLECTUAL PROPERTY LLC

Disclosed are a battery pack, a vehicle, and an energy storage device. The battery pack comprises a battery array and a support, wherein the battery array comprises several single batteries; each of the single batteries has a first size, which is the maximum value of the distance between two parallel planes for virtually clamping the single battery; and at least one of the single batteries satisfies: 600 mm the first size 2500 mm. The battery pack further comprises a shell, and an electrode core located in the shell; and the shell is provided with a support area, through which the single batteries are connected in butt-joint with the support and are supported on the support. The support is connected in butt-joint with the support area to support the single batteries.



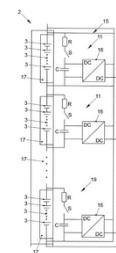
[ver más...](#)

US20200220225 Device for electropolishing an energy storage device comprising at least one lithium ion cell, charger, and method for operating the charger

Publicada en Tecnologías asociadas a consumo y reciclaje de energía, 08/07/2020.

Solicitantes: VOLKSWAGEN AKTIENGESELLSCHAFT; AUDI AG

A device for electropolishing an energy storage device having at least one lithium-ion cell comprises at least one actuatable first switch which is connected in series to a capacitor and an electrical resistor for current limitation parallel to at least one lithium ion cell, wherein an apparatus for discharging the capacitor is connected in parallel at least to the capacitor (C). The invention further relates to a charger and to a method for operating the charger.



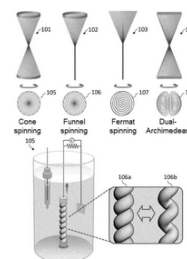
[ver más...](#)

US20200208614 Coiled and twisted nanofiber yarns for electrochemically harvesting electrical energy from mechanical deformation

Publicada en Tecnologías asociadas a consumo y reciclaje de energía, 01/07/2020.

Solicitantes: BOARD OF REGENTS, THE UNIVERSITY OF TEXAS SYSTEM; HANYANG UNIVERSITY

Yarn energy harvesters containing conducting nanomaterials (such as carbon nanotube (CNT) yarn harvesters) that electrochemically convert tensile or torsional mechanical energy into electrical energy. Stretched coiled yarns can generate 250 W/kg of peak electrical power when cycled up to 24 Hz, and can generate up to 41.2 J/kg of electrical energy per mechanical cycle. Unlike for other harvesters, torsional rotation produces both tensile and torsional energy harvesting and no bias voltage is required, even when electrochemically operating in salt water. Since homochiral and heterochiral coiled harvester yarns provide oppositely directed potential changes when stretched, both contribute to output power in a dual-electrode yarn.



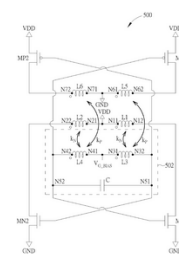
[ver más...](#)

US20200212843 Magnetically pumped voltage controlled oscillator

Publicada en Tecnologías asociadas a consumo y reciclaje de energía, 01/07/2020.

Solicitante: MEDIATEK INC.

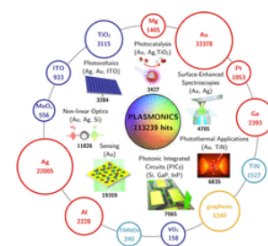
A voltage controlled oscillator includes a first inductor, a second inductor, a first metal oxide semiconductor (MOS) transistor, a second MOS transistor, and an inductor-capacitor (LC) tank circuit. A first end of the first inductor and a first end of the second inductor are coupled to a first power rail. A drain node of the first MOS transistor is coupled to a second end of the first inductor. A drain node of the second MOS transistor is coupled to a second end of the second inductor. Source nodes of the first MOS transistor and the second MOS transistor are coupled to a second power rail. The LC tank circuit is coupled to gate nodes of the first MOS transistor and the second MOS transistor, wherein energy is magnetically pumped into the LC tank circuit through the first inductor and the second inductor.



[ver más...](#)

Plasmonics beyond noble metals: Exploiting phase and compositional changes for manipulating plasmonic performance

Journal of Applied Physics, Volume 128, Issue 8, August 2020. Reconfigurable plasmonics constitutes an exciting and challenging new horizon in nanophotonics. This blooming field aims at providing plasmonic nanostructures that present a dynamic and active plasmonic response that can be switched or manipulated by external stimuli to induce a controllable change in the optical properties. Most common plasmonic materials, such as the noble metals gold and silver, cannot deliver this type of behavior. Therefore, significant effort is being invested in developing alternative materials whose optical properties can be controllably modified to provide a reconfigurable plasmonic response. In this perspective, several materials including non-noble metals, transition metal oxides and nitrides, and chalcogenide compounds will be analyzed. The selected materials share interesting characteristics like low cost, good chemical and thermal stabilities, and CMOS compatibility while presenting a reconfigurable plasmonic response governed by different phase-change mechanisms.



[Volver al índice](#)

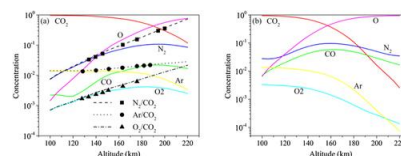


Prediction of the electron kinetics relevant for CO₂ splitting using in situ propellant production technology: Effect of the gas composition

Publicada en AIP Scitation, 23/08/2020.

Journal of Applied Physics, Volume 128, Issue 8, August 2020. Electron kinetics plays an essential role in CO₂ splitting in non-equilibrium plasmas. Indigenous resources, particularly CO₂ rich in the Martian atmosphere, are utilized as the feedstock for the technology of in situ propellant production (ISPP) in Mars missions. To obtain electron kinetics including electron energy distribution function (EEDF) and transport coefficients, a Boltzmann analysis is adopted. In view of ISPP in the upper Martian atmosphere, the complicated variation of the gas composition with the altitude in both dayside and nightside is considered. The composition of gas mixture is derived from the previous measurement data through site survey and numerical models. According to the results of calculation, altitude affects the behavior of EEDFs and transport coefficients in both dayside and nightside.

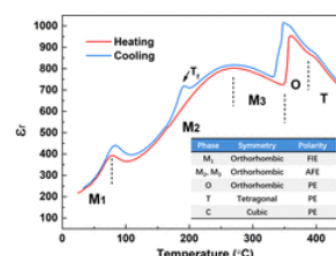
[ver más...](#)



Lead-free antiferroelectric AgNbO₃: Phase transitions and structure engineering for dielectric energy storage applications

Publicada en AIP Scitation, 18/08/2020.

Journal of Applied Physics, Volume 128, Issue 7, August 2020. The development of electronic materials for storing electrical energy is a thriving research field, where the materials used in batteries, supercapacitors, and dielectric capacitors have attracted extensive interest in last decades. The dielectric capacitors showing unique characteristics such as high power density and large charge/discharge rate have been actively studied, where the antiferroelectrics demonstrate great potentials for dielectric energy storage applications by storing and releasing energy upon a reversible electric-field induced antiferroelectric–ferroelectric phase transition.



[ver más...](#)

Dynamic evolution of thermally induced element distribution in nitrogen modified phase change materials

Publicada en AIP Scitation, 18/08/2020.

Journal of Applied Physics, Volume 128, Issue 7, August 2020. In the semiconductor industry, doping modification is a common and effective method to regulate the properties of materials. For Ge₂Sb₂Te₅ (GST) phase change materials, incorporation with nitrogen has been widely reported due to improvement in its thermal stability and reduction in its power consumption. However, whether in amorphous or crystalline structures, the distribution of N is still unclear since it is low in content and insensitive in the electron microscopy detection. Here, by employing advanced atom probe tomography technology, we directly reveal the three-dimensional element distribution in different N-doped GST (NGST) structures and systematically analyze the evolution of element distribution during phase change. Nitrogen is found to be homogeneously distributed in the as-deposit amorphous NGST as nanoscale N-rich clusters most together with germanium.

[ver más...](#)

Development of eco-sustainable plasters with thermal energy storage capability

Publicada en AIP Scitation, 16/08/2020.

Journal of Applied Physics, Volume 128, Issue 7, August 2020. In order to limit the energy demand of buildings, a possible strategy consists in the storage of thermal energy using phase change materials (PCMs). In this work, an innovative PCM-enhanced plaster, fully formulated by using materials coming from natural resources, was developed. The PCM (i.e., a biodegradable material from agricultural resources having a melting temperature of 23°C) was shape-stabilized with a direct absorption method by using a proper combination of different inorganic powders, taking into account also the final cost of the product and the processability issues. The most important physical properties of the plaster were then investigated following the European standards and compared with those of a natural hydraulic lime commercial plaster. The optimized PCM-enhanced plaster could be classified as a lightweight plaster (LW class according to UNI EN 1015-10) with compressive strength CSI (UNI EN 1015-11) and water absorption class W2 (UNI EN 1015-18). Differential scanning calorimetry tests confirmed the thermal energy storage capability of the PCM-enhanced plaster, even though plaster processing operations slightly decreased the specific melting enthalpy of the PCM within the plaster.

[ver más...](#)

Improving the performance of phase-change memory by grain refinement

Publicada en AIP Scitation, 16/08/2020.

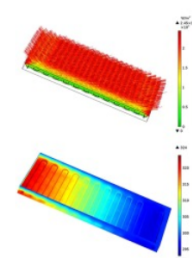
Journal of Applied Physics, Volume 128, Issue 7, August 2020. Many experiments have shown that three-dimensional-confined grain refinement (GR) textures in phase-change memory reduce power consumption and improve endurance performance. However, a lack of knowledge on the GR mechanisms and their influence on device performances challenges designs that concurrently enhance the comprehensive device performances using the same impurity-doped strategy. Here, we experimentally observe dramatic GR in carbon-doped Ge₂Sb₂Te₅ (GST), which also presents reduced power consumption and enhanced endurance performances. We provide low power consumption evidence that thermal conductivity controls the thermal transport heat loss and is proportional to the size of nanoscale grains because the boundary severely scatters phonons. Our simulations indicate that the short carbon chains in the boundary interlace with each other and trend to form trialkyl carbon atoms that constitute the basic local environment of graphene. The stable sheet consists of aggregated carbon, which is even stable above the melting temperature of GST and acts as a second-phase drag to refine the grain size.

[ver más...](#)

Coupled optical and thermal analyses of a new type of solar water heaters using parabolic trough reflectors

Publicada en Sustainable Energy Technologies and Assessments, 13/08/2020.

Publication date: August 2020 Source: Sustainable Energy Technologies and Assessments, Volume 40 Author(s): Vahid Madadi Avargani, Amir Rahimi, Mohammad Divband. A new type of solar water heating system using an array of parabolic trough collectors (PTCs) was investigated. A coupled simulation technique was used to solve the complex radiation, convection, and conduction heat transfer problem inside the system. The realistic non-uniform heat flux at the walls of the receiver pipe was obtained by optical analysis and was used simultaneously in thermal modeling.

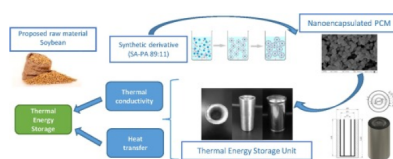


[ver más...](#)

Preparation and characterization of nanoencapsulated synthetic soybean oil derivative-an abundant and environmentally friendly phase change material-heat transfer analysis and applications

Publicada en Sustainable Energy Technologies and Assessments, 13/08/2020.

Publication date: October 2020 Source: Sustainable Energy Technologies and Assessments, Volume 41 Author(s): Jorge Bergamo, Ezequiel Rossi, Juan Martín Maffi, Laura De Angelis, María Inés Errea. The thermal properties of a phase change material (PCM), together with its environmental health risks and natural abundance are important aspects to consider when choosing one for a domestic application. In this work, a soybean oil derivative, which comes from one of the most abundant crops on Earth, is proposed as PCM.



[ver más...](#)

Granular superconductors for high kinetic inductance and low loss quantum devices

Publicada en AIP Scitation, 10/08/2020.

Applied Physics Letters, Volume 117, Issue 6, August 2020. Granular aluminum is a promising material for high kinetic inductance devices such as qubit circuits. It has the advantage over atomically disordered materials such as NbN_x, to maintain a high kinetic inductance concomitantly with a high quality factor. We show that high quality nano-scale granular aluminum films having a sharp superconducting transition with normal state resistivity values on the order of 10^{-4} Ω and kinetic inductance values on the order of 10^{-4} H can be obtained, surpassing the state-of-the-art values. We argue that this is a result of the different nature of the metal-to-insulator transition, being electronic correlations driven (Mott type) in the former and disorder driven (Anderson type) in the latter.

[ver más...](#)

Effect of physical and geometrical parameters on vertical magnetic stiffness when a permanent magnet moves vertically above a high-temperature superconductor

Publicada en AIP Scitation, 07/08/2020.

Journal of Applied Physics, Volume 128, Issue 5, August 2020. Magnetic stiffness is as important as vertical and lateral forces to achieve stable levitation in high-temperature superconductor (HTS) levitation systems. To date, research on magnetic stiffness has mainly focused on a few aspects, but the understanding of its comprehensive characteristics has not been included. This study is focused on the quantitative properties of the physical and geometrical parameters that affect the vertical stiffness of HTS levitation systems using a numerical approach when a permanent magnet (PM) above the HTS bulk moves vertically under both zero-field cooling and field cooling (FC) conditions. The results show that the magnetic field of the PM, the critical current density (J_c), and the PM to HTS area ratio (λ) significantly affect the vertical stiffness, while the PM to HTS thickness ratio has little effect. In addition, some unexpected phenomena were discovered. At some large vertical distances, the vertical stiffness first decreased and then increased as the external magnetic field increased under FC. The phenomenon of sign switching for the vertical stiffness appears to be related to several parameters, such as the external magnetic field, J_c , and λ .

[ver más...](#)

Replication Data for: A Field Experiment on Workplace Norms and Electric Vehicle Charging Etiquette

Publicada en <https://dataverse.harvard.edu/>, 30/07/2020.

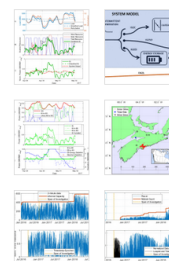
This dataset contains information from 3,395 high resolution electric vehicle charging sessions. The data contains sessions from 85 EV drivers with repeat usage at 105 stations across 25 sites at a workplace charging program. The workplace locations include facilities such as research and innovation centers, manufacturing, testing facilities and office headquarters for a firm participating in the U.S. Department of Energy (DOE) workplace charging challenge. The data is in a human and machine readable *.CSV format. The resolution of the data is to the nearest second, which is the same resolution as used in the analysis of the paper. It is directly importable into free software.

[ver más...](#)

Combining wind, solar, and in-stream tidal electricity generation with energy storage using a load-perturbation control strategy

Publicada en <https://www.sciencedirect.com>, 15/07/2020.

Combining intermittent renewable generation with energy storage in the electricity grid has become a preferred route to maintaining stability and reliability while decarbonizing. The effects of combining three uncorrelated intermittent resources with energy storage are not well understood. This study reports on a data-driven model and control strategy that optimizes relative installed capacities of wind, solar, and in-stream tidal generation with energy storage for smoothing and shaping to follow electrical load perturbations. T

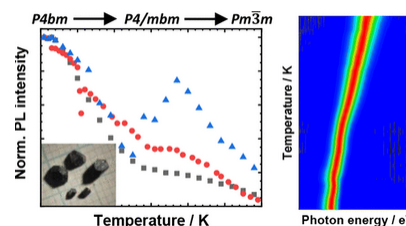


[ver más...](#)

Negative Thermal Quenching in FASnI_3 Perovskite Single Crystals and Thin Films

Publicada en ACS Energy Letters, 14/07/2020.

ACS Energy Letters DOI: 10.1021/acsenergylett.0c01166. Formamidinium tin triiodide (FASnI_3) is a strong contender for sustainable harvesting of solar energy and further optoelectronic applications. So far, only a few studies have considered its fundamental structure–property relationships, given the challenge of ensuring a high material quality. In a concerted effort, we here study high-quality FASnI_3 single crystals through a combination of X-ray crystallography, density-functional-theory-based electronic structure calculations, and photoluminescence spectroscopy from room temperature down to 4K.

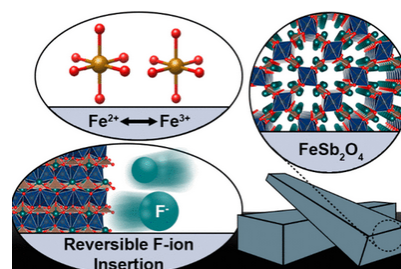


[ver más...](#)

Reversible Room-Temperature Fluoride-Ion Insertion in a Tunnel-Structured Transition Metal Oxide Host

Publicada en ACS Energy Letters, 14/07/2020.

ACS Energy Letters DOI: 10.1021/acsenenergylett.0c01328 An energy storage paradigm orthogonal to Li-ion battery chemistries can be conceptualized by employing anions as the primary charge carriers. F-ion conversion chemistries show promise but have limited cyclability as a result of the significant change in volume of active electrodes upon metal–metal fluoride interconversion. In contrast, the exploration of insertion chemistries has been stymied by the lack of hosts amenable to reversible F-ion insertion at room temperature.



[ver más...](#)

