

# What are the patents for concrete energy storage

Can concrete be used for energy storage?

We've written before about the idea of using concrete for energy storage - back in 2021, a team from the Chalmers University of Technology showed how useful amounts of electrical energy could be stored in concrete poured around carbon fiber mesh electrodes, with mixed-in carbon fibers to add conductivity.

What are the applications of cement technology?

The technology has potential applications towards bulk energy storage, on-road EV charging, self-heating pavements, energy-autarkic structures, and more. Is cement the solution to storing renewable energy?

Can a carbon-cement supercapacitor store energy?

MIT engineers created a carbon-cement supercapacitor that can store large amounts of energy. Made of just cement, water, and carbon black, the device could form the basis for inexpensive systems that store intermittently renewable energy, such as solar or wind energy.

Could a supercapacitor provide cheap and scalable energy storage?

Made of cement, carbon black, and water, the device could provide cheap and scalable energy storage for renewable energy sources. MIT engineers have created a "supercapacitor" made of ancient, abundant materials, that can store large amounts of energy.

Could a new 'supercapacitor' concrete foundation Save Energy?

Since the new "supercapacitor" concrete would retain its strength, a house with a foundation made of this material could store a day's worth of energy produced by solar panels or windmills, and allow it to be used whenever it's needed.

Are carbon-cement supercapacitors a scalable bulk energy storage solution?

Carbon-cement supercapacitors as a scalable bulk energy storage solution. Proceedings of the National Academy of Sciences, 120 (32), e2304318120. Soliman, N. A., Chanut, N., Deman, V., Lallas, Z., & Ulm, F. J. (2020). Electric energy dissipation and electric tortuosity in electron conductive cement-based materials.

Concrete technologies provide a sustainable option for large-scale energy storage by leveraging the inherent properties of concrete to facilitate energy capture, retention, ...

FIG. 8 shows the method of charging 800 the pumped energy storage system 600 shown in FIG. 6. The method of charging 800 the pumped energy storage system 600 includes first heating the heated particles 102A, 805. The heating may be done in both the silo 101A using an in-silo heating element (such as 108, not shown in FIG. 6) using power from an ...

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Researchers at the Massachusetts Institute of Technology (MIT) have developed a groundbreaking technology that could revolutionize energy storage by turning concrete into a giant battery writes Tom Ough for the BBC. This innovative approach, led by Damian Stefaniuk, involves creating supercapacitors from a mix of water, cement, and carbon ...

The Gravity energy storage and generating device, main object of the invention is to provide improved mechanical energy storage and release device comprising of the wound and weight energy storing elements. The said device installed in the ground or above where gravity plays a vital role in generating and storing, a large stainless steel encased concrete piston mass that ...

Definitions. the present patent application relates to energy storage technologies and more particularly to an energy storage bridge that utilizes steel pipes instead of the traditional beams as load carrying girders and in addition as a Compressed Air Energy Storage (CAES) units, to store the energy of unwanted electricity in the grid during low-demand sessions, or ...

An energy storage robot configured to be used to power electric underground equipment, the energy storage robot including a propulsion system being arranged to move the energy storage robot, an energy storage unit, a control unit being connected to the propulsion system and the energy storage unit. The energy storage unit is connectable to the electric ...

The BolderBlocs concrete thermal energy storage system can be charged from steam, waste heat or resistively heated air, functioning for hours or days with minimal losses. Modular BolderBloc assemblies can produce steam or hot air when needed and be configured for a wide range of capacities and applications--from small industrial systems to ...

The present invention provides novel designs and improved methods for the construction and operation of a gravity powered energy storage facility. This facility might also be called a gravity battery or a gravitational potential energy storage device. The device converts electricity into gravitational potential energy, and vice versa, by raising and lowering massive ...

The field of concrete energy storage is characterized by 1. innovative technologies, 2. environmental benefits, 3. economic viability, 4. diverse applications. The patents associated with this domain reveal a focus on utilizing concrete structures to harness and store energy efficiently.

A use of a hardened substance mixture comprising at least one cement component as a chemical energy store is disclosed. The hardened mixture, which has an ettringite content of 40 wt .-% to 90 wt .-%, can be used due to its mechanical properties and strength to create components which have not only the energy storage properties but also load-bearing properties and accordingly ...

A an energy storage system includes a crane and a plurality of blocks, where the crane is operable to move

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blocks from a lower elevation to a higher elevation (via stacking of the blocks) to store electrical energy as potential energy of the blocks, and then operable to move blocks from a higher elevation to a lower elevation (via unstacking of the blocks) to generate electricity ...

An underwater energy storage system comprising a container where energy is stored by transporting water between the container and a body of water, is disclosed. 5 The container comprises a water- and gas-tight membrane surrounding a container volume, where the container is rendered mainly incompressible by a fill material comprising densely packed, ...

A hydro electric energy generation structure is disclosed. The structure comprises: a gravity wall forming a closed outer perimeter extending above an upper water level of an existing hydraulic reservoir, and extending below the reservoir floor; at least one water inlet hydraulically connecting a first penstock to a first turbine generator below the water inlet.

An example flywheel energy storage device includes a fiber-resin composite shell having an elliptical ovoid shape. ... traditional mass focused flywheel was demonstrated commercially with a 2,270 kilogram unit storing 50 kilowatt-hours of energy. Even the utilization of concrete materials for a traditional mass focused flywheel was demonstrated ...

MIT engineers developed the new energy storage technology--a new type of concrete--based on two ancient materials: cement, which has been used for thousands of years, and carbon black, a black ...

technology for renewable energy storage Damian Stefaniuk\*, Nicolas Chanut, James ... How to reduce the environmental footprint of concrete and address energy storage challenge? Slide 2 Near future: \$200 per ton ... Patent. Soliman et al. (2020). Electric energy dissipation and electric tortuosity in electron conductive cement-based materials. ...

The invention relates to light-emitting concrete, particularly a preparation method of energy-storage light-emitting concrete. The energy-storage light-emitting concrete is prepared from the following raw materials in percentage by weight: 2-8% of fluorescent powder, 18% of white cement, 27% of standard sand, 39-47% of gravel and 8% of water.

Ulm says that the system is very scalable, as the energy-storage capacity is a direct function of the volume of the electrodes. "You can go from 1-millimeter-thick electrodes to 1-meter-thick ...

The CSHub has long investigated multifunctional concrete, and has uncovered a way to store energy in a mixture of carbon black, cement, and water. The technology has potential applications towards bulk energy storage, on-road EV charging, self-heating pavements, energy-autarkic structures, and more. News

Energy-Storage.news also reported today on a partnership between thermal energy storage technology

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developer Azelio and Mexico-based industrial equipment supplier and turnkey project developer CITRUS. Azelio uses heated aluminium to store energy and the pair have signed a Memorandum of Understanding (MoU) with a view to marketing the technology ...

The invention relates to a long-term heat storage device for long-term storage of solar energy and other types of energy, in the heat storage material of which a rock bulk material, in particular of volcanic origin, such as diabase, basalt, granite and gneiss, is used. The rock bulk material forms a polydisperse bulk material, in particular as the void volume of the rock bulk material ...

The heated particles are then gravity-fed into insulated concrete silos for thermal energy storage. The baseline system is designed for economical storage of up to a staggering 26,000 MWh of thermal energy. ... and Solar Energy Division 2021 First-Place Best Paper Award and several U.S. Department of Energy technology funding awards. Patents on ...

This supercapacitor breakthrough holds significant promise for stationary energy storage, pivotal in accommodating the sporadic nature of renewable energy sources. In stark ...

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

A system for harvesting, storing, and/or generating energy includes a subsurface structure supporting machinery to convert received energy into potential energy, store that potential energy, and later convert that potential energy into electrical energy. The system includes one or more buoyant chambers that support the subsurface structure and are maintained with an internal ...

This groundbreaking innovation has garnered support from the MIT Concrete Sustainability Hub and the Concrete Advancement Foundation. In essence, the convergence of ubiquitous materials--cement and carbon black--has paved the way for a transformative energy storage solution, portending far-reaching implications for the realm of renewable energy.

This innocuous, dark lump of concrete could represent the future of energy storage. The promise of most renewable energy sources is that of endless clean power, bestowed on us by the Sun, wind and ...

The MIT team says a 1,589-cu-ft (45 m<sup>3</sup>) block of nanocarbon black-doped concrete will store around 10 kWh of electricity - enough to cover around a third of the power consumption of the ...

The present invention provides a distributed energy storage system, and applications thereof. In an embodiment, the distributed energy storage system includes power units, wherein each power unit has a

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multi-cell battery; a battery manager that monitors battery cell voltages and temperatures; and a controller. The controller provides a first control signal that causes the ...

The energy storage capacity of this space-filling carbon black network of the high specific surface area accessible to charge storage is shown to be an intensive quantity, whereas the high-rate ...

A compressed fluid energy storage system includes a submersible fluid containment subsystem charged with a compressed working fluid and submerged and ballasted in a body of water, with the fluid containment subsystem having a substantially flat portion closing a domed portion. The system also includes a compressor and an expander disposed to ...

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