

JH Solar

Intelligent phase change energy storage heating system



Overview

Among the numerous methods of thermal energy storage (TES), latent heat TES technology based on phase change materials has gained renewed attention in recent years owing to its high thermal storage capacity, operational simplicity, and transformative industrial potential. Here, we review the broad.

Among the numerous methods of thermal energy storage (TES), latent heat TES technology based on phase change materials has gained renewed attention in recent years owing to its high thermal storage capacity, operational simplicity, and transformative industrial potential. Here, we review the broad.

This research investigates sustainable phase change materials (PCMs) for latent heat thermal energy storage systems using data-driven machine learning models. Activated biochar is incorporated as a support material to improve the PCM's thermal conductivity and leak resistance during phase.

This paper proposed a dynamic model-based configuration and operation optimization method for an renewable integrated energy system (IES) containing heat pump coupled with phase change material and water (PCM) energy storages, considering thermal inertia and thermal comfort elasticity. Research.

Intelligent phase change energy storage heating system



Recent Advances in Phase Change Energy Storage Materials: ...

Abstract Phase change energy storage (PCES) materials have attracted considerable interest because of their capacity to store and release thermal energy by ...

Optimization of integrated energy system with phase-change ...

Abstract This paper proposed a dynamic model-based configuration and operation optimization method for an renewable integrated energy system (IES) containing heat pump coupled with ...



Performance and optimization of a novel solar-air source heat ...

The air source heat pump can be used for cooling in summer. In addition, combined with night energy storage (cold storage and heat storage), the "peak load shifting" ...

Data-driven approaches to sustainable phase change material ...

This research investigates sustainable phase change materials (PCMs) for latent heat thermal energy storage systems using data-driven machine learning models. Activated ...



Phase Change Materials in Thermal Energy Storage: A ...

Thermal energy storage (TES) technology relies on phase change materials (PCMs) to provide high-quality, high-energy density heat storage. However, their cost,



Recent Advances in Organic Phase Change Materials for Thermal Energy

The rising worldwide energy demand and the pressing necessity to reduce greenhouse gas emissions have propelled the advancement of sustainable thermal energy ...



Passive and active phase change materials integrated building energy

Integrating phase change materials (PCMs) in buildings cannot only enhance the energy performance, but also improve the renewable utilization efficiency through considerable ...

A review of artificial intelligence to thermal energy storage and heat

This paper examines the applications of artificial intelligence (AI) in predicting and optimizing phase change material (PCM) parameters for heat storage and transport systems.



Intelligent phase change materials for long-duration thermal energy storage

Conventional phase change materials struggle with long-duration thermal energy storage and controllable latent heat release. In a recent issue of Angewandte Chemie, Chen et ...

Phase change materials for thermal energy ...

Thermal energy storage (TES) with phase change materials (PCM) was applied as useful engineering solution to reduce the gap between energy supply and energy demand in cooling or heating applications by ...



Data-driven approaches to sustainable phase change material ...

This research explored sustainable phase change materials (PCMs) for latent heat thermal energy storage systems, leveraging data-driven machine learning models.

A control method of electric boiler phase change thermal storage

In order to verify the effectiveness of the proposed method, an automatic control experimental platform (phase change thermal storage heating system based on paraffin-based ...



An Intelligent, Solar-Responsive, and Thermally Conductive Phase-Change

The solar-responsive phase-change system achieves daytime blooming for solar-thermal conversion with simultaneous energy storage and nighttime closing for ...

Recent Advances in Phase Change Energy Storage Materials: ...

PCESMs are employed in the construction industry for passive solar heating, thermal regulation, and energy-efficient building designs. They facilitate effective thermal ...

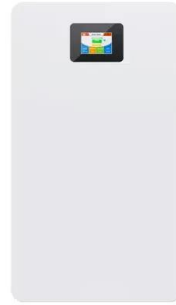


A two-level optimal scheduling control strategy for ...

An electric-thermal coupled model for air source heat pump load with phase change energy storage is proposed. A dual-layer optimization and control strategy for heat pump load is presented. Cyclic ...

Thermal energy storage using phase change material for solar ...

A material can store heat energy in three forms i.e., sensible heat storage, latent heat storage, and thermo-chemical heat storage [21]. In sensible heat storage, the ...



Application of phase-change energy storage technology in heat pump systems

To facilitate the integrated application of phase-change energy storage technology and heat pump technology, the ways to improve the coefficient of performance (COP) of heat pumps, reduce ...

Magnetically-responsive phase change thermal storage materials

The distinctive thermal energy storage attributes inherent in phase change materials (PCMs) facilitate the reversible accumulation and discharge of significant thermal ...



CN111351117A

The invention provides an intelligent phase-change energy-storage environment-friendly heating unit which comprises a heating radiator, a water inlet joint, a water outlet joint, a water inlet ...

CN111412515A

The invention discloses an integrated intelligent household phase-change heat storage heating system and method. The problem of low power consumption efficiency during the off-peak ...



Committed To Phase Change Energy Storage and Temperature ...

The steam thermal battery, developed by Heatmate, is an integrated high-temperature phase-change heat storage and steam production system. Using proprietary nano-eutectic phase ...

An Intelligent, Solar-Responsive, and Thermally Conductive ...

To alleviate resource shortage and environmental pollution, solar energy can be converted into thermal energy stored in phase change materials and in turn generate electrical ...



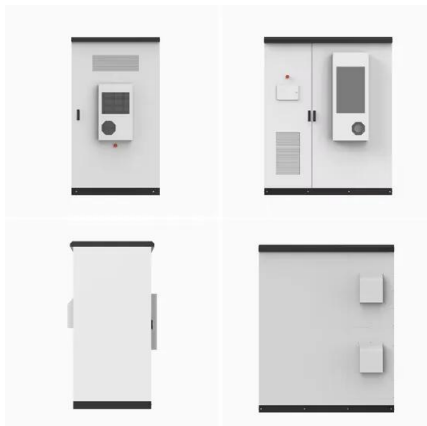
An Intelligent, Solar-Responsive, and Thermally ...

The solar-responsive phase-change system achieves daytime blooming for solar-thermal conversion with simultaneous energy storage and nighttime closing for minimizing heat loss to the environment, ...



Towards Phase Change Materials for Thermal ...

These compounds can be incorporated into building construction materials and provide passive thermal sufficiency, or they can be used in heating, ventilation, and air conditioning systems, domestic hot ...



Phase-change materials for intelligent temperature regulation

Thermal property and latent heat energy storage behavior of sodium acetate trihydrate composites containing expanded graphite and carboxymethyl cellulose for phase ...

Phase-Change Material Thermal Energy Storage ...

This article presents the use of phase-change material (PCM) thermal storage within the Horizon 2020 HEART project (Holistic Energy and Architectural Retrofit Toolkit), aimed at decarbonising the ...





Research progress of phase change heat storage technology in ...

By using phase change heat storage technology in solar heat pumps, it is possible to upgrade the performance coefficient of heat pumps, alleviate the inconvenience ...

Performance optimization of phase change energy storage ...

...

Combined cooling, heating, and power systems present a promising solution for enhancing energy efficiency, reducing costs, and lowering emissions. This study focuses on improving ...



An Intelligent, Solar-Responsive, and Thermally Conductive Phase-Change

The solar-responsive phase-change system achieves daytime blooming for solar-thermal conversion with simultaneous energy storage and nighttime closing for minimizing heat loss to ...

Role of phase change materials and digital twin technology in ...

...

This study examines the role of phase change materials (PCMs) and digital twin (DT) technology in thermal energy storage (TES), drawing on an analysis of 89 research ...





Research on the performance of phase change energy storage ...

This article designs a high-altitude border guard post that can fully utilize the heat absorbed by solar collectors to continuously store thermal energy during the day and ...

Application and research progress of phase change energy storage ...

The advantages and disadvantages of phase change materials are compared and analyzed. Summary of the application of phase change storage in photovoltaic, light heat, ...



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