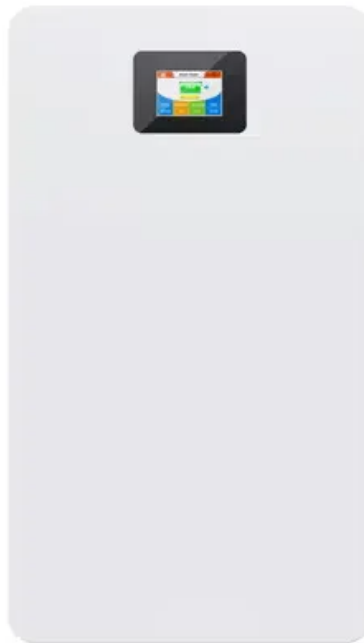


Application of phase change energy storage mortar



Overview

This study develops a novel shape-stabilized coal gasification slag/paraffin (CGS-P) phase-change material for use in cement mortar to reduce indoor temperature fluctuations.

This study develops a novel shape-stabilized coal gasification slag/paraffin (CGS-P) phase-change material for use in cement mortar to reduce indoor temperature fluctuations.

The objective of the present work is to develop a composite PCM with expanded perlite as supporting material and expanded graphite added towards enhancement of thermal conductivity, making it suitable for thermal energy storage (TES) applications.

Based on long short term memory (LSTM) neural network, the machine learning-based heat storage and release prediction model was established, and the temperature changes during the heat storage and release process of the three PCMs and the room were predicted and analysed.

To explore the application of phase change energy storage materials in building energy conservation, in this study, an innovative composite thermal energy storage cement mortar.

High thermal energy storage and low mass were compatible in PCM-GHB mortars. The aim of the work is to design lightweight thermal insulation mortar with function of improved thermal characteristics using glazed hollow beads and micro-encapsulated phase change materials (PCM). Can phase change energy storage materials be used in building energy conservation?

To explore the application of phase change energy storage materials in building energy conservation, in this study, an innovative composite thermal energy storage cement mortar (CTESCM) was developed using lauric acid-palmitic acid/expanded graphite (LA-PA/EG) as the composite phase change material (CPCM).

Can composite phase change material improve the freeze-thaw resistance of

cement mortars?

Yu et al. produced a composite phase change material to improve the freeze-thaw resistance performance of cement mortars, and the composite method and experimental results are helpful for understanding the freeze-thaw mechanism of cement mortars 40.

What are phase change energy storage building structures?

Phase change walls, floors, roofs, mortar, etc., all belong to phase change energy storage building structures. Incorporating PCMs into coatings to form fixed CPCMs not only beautifies and protects the appearance of buildings but also achieves the goal of regulating indoor comfort through the heat storage and release performance of PCMs.

Does phase change material increase thermal insulation?

Research by Das, R et al. mainly focused on the use of phase change material (PCM) with low thermal conductivity and high heat storage in buildings, and it was observed that adding 10% micro-encapsulated phase change material (MPCM) to mortar decreased its thermal conductivity by 22%, thereby increasing the material's thermal insulation 38.

What is heat storage cement mortar (HSCM)?

Li et al. developed a heat storage cement mortar (HSCM) incorporating expanded graphite (EG)/paraffin CPCM. The research results showed that the heat storage coefficient of an HSCM plate is 1.74 times that of ordinary cement mortar and that it has good heat storage performance 33.

Does organic bio-nano-doped phase change material reduce thermal storage capacity of PCM 37?

Selvasofia S. D. Anitha et al. synthesized an organic bio-nano-doped phase change material for building energy management. The results demonstrated that the inclusion of bio-nanoparticles above a 1.0% mass fraction significantly reduced the thermal storage capability of the PCM 37.

Application of phase change energy storage mortar



Performance of energy storage system containing cement mortar ...

The experimental results indicate that TESA can be applied to wall-plastering cement mortar, reducing energy consumption by decreasing the indoor temperature and ...

Development and thermal response of concrete

Expanded titanium-bearing blast furnace slag phase change aggregate: Preparation, performance and phase change energy storage mortar application 2024, Journal ...



Microsoft Word

Abstract In this study, cement-based thermal energy storage composites (TESC) were developed by integrating a novel phase change material (PCM) composite into ordinary cement mortar ...

Expanded titanium-bearing blast furnace slag phase change ...

Download Citation , On Dec 1, 2023, Mao Ning and others published Expanded titanium-bearing blast furnace slag phase change aggregate: Preparation, performance and phase change ...



Preparation, microstructure, performance and mortar application ...

The application of phase change materials (PCM) in building energy saving is limited by the cost and performance of PCM carriers. Using solid waste as a PCM carrier can reduce cost and ...

Towards Phase Change Materials for Thermal Energy ...

Thermal energy storage systems with PCMs have been investigated for several building applications as they constitute a promising ...



Thermal and mechanical properties of thermal energy storage ...

In this work, phase change material (PCM) was implanted into the mortar to produce lightweight aggregate-phase change thermal insulation composites, and the ...

Application research and effectiveness analysis of phase change

The construction industry is responsible for a significant amount of global energy consumption and CO₂ emissions. To address this issue, phase change material (PCM) is ...



Application effect of composite phase change energy storage

...

The composite phase change energy storage thermal insulation mortar with reasonable formula had a suitable phase transition temperature of 25.6°C and a higher phase ...

Impact of microencapsulated phase change materials (PCMs) on ...

This study investigates the integration of Microencapsulated Phase Change Materials (MPCM) into cement mortar to enhance its thermal performance while assessing its ...



Thermal Energy Storage Enhancement of Lightweight Cement Mortars ...

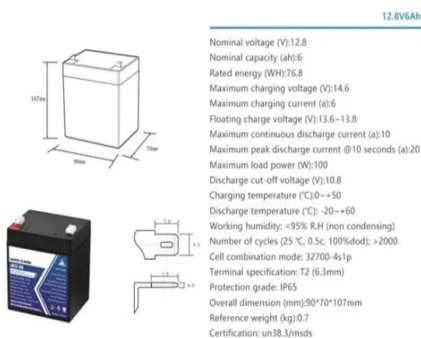
Abstract and Figures In this study, cement-based thermal energy storage composites (TESC) were developed by integrating a novel phase change material (PCM) ...



Mechanical and thermal properties of building mortars

...

Hence, to address the above issues, this study mainly focuses to use low thermal conductive and high heat storage phase change material (PCM) in building. In order to ...



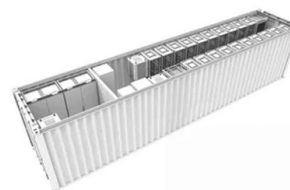
Investigations on the Thermal Performance of Mortar Boards

...

One of the most innovative energy technologies for increasing the sustainability and energy efficiency of buildings is the potential incorporation of phase change materials ...

Comprehensive study on thermal properties and application of phase

Phase Change Materials (PCMs) are increasingly recognized in the construction industry for their ability to enhance thermal energy storage and improve building ...





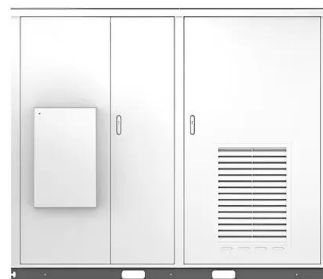
Preparation and characterization of innovative cement ...

To explore the application of phase change energy storage materials in building energy conservation, in this study, an innovative ...

Phase Change Materials for Energy Efficiency in ...

The development of novel building materials able to improve the efficiency in energy utilization in the buildings is gaining increasing interest in ...

Solar



Study of a thermally enhanced mortar incorporating phase change

The use of thermal energy storage systems incorporating Phase Change Materials (PCM) as passive thermal regulators, in innovative buildings' applications is an ...

Application of form-stable paraffin/nano-silica phase change ...

Application of form-stable paraffin/nano-silica phase change materials for thermal energy Storage in mortar Md Rasidul Islam¹, Xiangyu Li²



Development of a novel composite phase change material based ...

The research work proposes the characterization of eutectic fatty acid mixture [Lauric and Palmitic acid (LA-PA)] centered form-stable phase change material (FSPCM) ...



Thermal energy storage cement mortar with direct incorporation of

Direct incorporation of phase change materials (PCMs) in the mortar matrix increases the effective thermal mass of a structure without increasing the size or significantly ...



A novel $\text{CaCl}_2 \cdot 6\text{H}_2\text{O}$ - $\text{SrCl}_2 \cdot 6\text{H}_2\text{O}$ - $\text{TiO}_2/\text{EP}/\text{Cement}$ Mortar ...

2 ??? By integrating phase change materials with low subcooling and high latent heat into cement mortar, a novel multifunctional brick was developed, achieving the integration of ...



Enhancing thermal energy storage efficiency at low temperatures ...

In this study, phase change material (PCM) was encapsulated in a novel aluminium-based macro-capsule and indirectly applied to cement-based mortar to address ...



Performance of energy storage system containing cement mortar ...

PCMs are well known as promising energy storage materials because they improve the energy efficiency of buildings [3]. They have a narrow temperature range during ...

A novel $\text{CaCl}_2 \cdot 6\text{H}_2\text{O}$ - $\text{SrCl}_2 \cdot 6\text{H}_2\text{O}$ - $\text{TiO}_2/\text{EP}/\text{Cement}$ Mortar composite phase

2 ???· By integrating phase change materials with low subcooling and high latent heat into cement mortar, a novel multifunctional brick was developed, achieving the integration of ...



Thermo-mechanical properties of compaction molded cement ...

This study presents a novel compaction molded composite of sulfoaluminate cement-based thermal energy storage mortar (SCTESM) containing shape stabilized phase ...



Application effect of composite phase change energy storage

...

The test results show that, the composite phase change energy storage thermal insulation mortar has a good heat preservation and storage and release effect, and has an obvious improvement

...



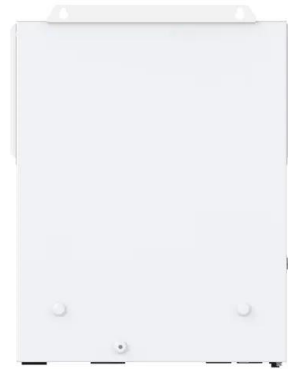
A novel capric-stearic acid/expanded perlite-based cementitious mortar

In this work, the potential application of Capric-stearic acid/Expanded perlite (CA-SA/EP) thermal storage composite was prepared by vacuum impregnation method with EP as ...



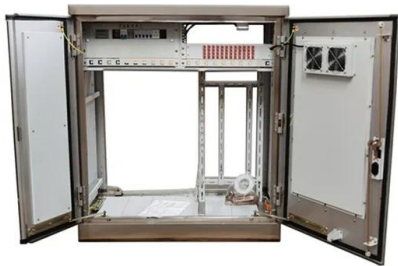
Development of a novel composite phase change material based ...

The objective of the present work is to develop a composite PCM with expanded perlite as supporting material and expanded graphite added towards enhancement ...



A comprehensive investigation on the properties of ...

PCMs are materials that have a larger energy storage density, unlike traditional mortar, mortar with PCM can regulate indoor temperature through phase change in response ...



Composite energy storage cement-based mortar including coal

To mitigate the growing energy consumption of the construction industry, researchers have developed thermal energy storage technology using phase-change materials ...



Preparation and study of phase change energy storage building ...

Based on long short term memory (LSTM) neural network, the machine learning-based heat storage and release prediction model was established, and the temperature ...



Preparation and characterization of innovative cement mortar

To explore the application of phase change energy storage materials in building energy conservation, in this study, an innovative composite thermal energy storage cement mortar ...



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Thermal Energy Storage Enhancement of Lightweight Cement ...

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