

# The role of building solar container and temperature regulating mortar

<div class="df\_qntext">Why is thermal energy storage important?

Conventional building materials (e.g.,concrete) usually show poor thermal storage properties,and thus they often result in unsatisfactory building energy performance. In recent decades,the thermal energy storage system is rapidly developed and proved to be an effective means to address this issue [86,87].

<div class="df\_qntext">Which material is used to modulate solar thermal properties?

This section mainly reviews the three most popular ones including thermochromic window,daytime radiative cooling material and phase change material,which are adopted to modulate the solar optical property,infrared emittance and thermal property of the building envelope,respectively.

<div class="df\_qntext">What is thermal regulating materials & systems?

It systematically reviews the advanced thermal regulating materials and systems in buildings. It classifies the materials and systems from building envelope and body envelope applications perspectives. In each perspective, the materials and systems are categorized into the passive and active types.

<div class="df\_qntext">How do thermochromic windows regulate solar radiation?

Thermochromic window,a pane of glass coated by thermochromic material,can dynamically change its solar transmittance responding to ambient temperature variationsand thus effectively regulate the solar radiation heat [42,43].

<div class="df\_qntext">Why is thermal regulation important for envelope applications?

In the aspect of thermal regulation property,for both envelope applications the advanced materials and systems involving two or more thermal regulation routes are more promising to achieve improved performance due to the synergistic effects.

<div class="df\_qntext">What are active thermal regulating materials and systems?

Other active thermal regulating materials and systems include the water-flow glazing,nanocrystal in-glass composite window,pipe-embedded wall systemand so on [134,,,.]. In the water-flow glazing,the clear water flows upwards or downwards between two glass panes driven by a pump.

Thermal insulation mortar is divided into organic thermal insulation mortar and inorganic thermal insulation mortar according to its chemical composition. Among them, inorganic thermal insulation ...

The selection of the melting temperature for the PCM for incorporation into the mortar was chosen based on existing knowledge of typical temperature development observed in practice ...

In this research, cement mortars were prepared with equivalent air contents using different air-entraining

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admixtures (AEAs) to measure their fresh-state performance and hardened air ...

This paper concludes that thermal mortar has certain advantages in insulation building materials. Where, Thermal insulation glazed hollow bead mortar as a new inorganic thermal mortar ...

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 work aims to study the hydrothermal behavior of mortar cement toward certain environmental factors (ambient air temperature and air velocity) based on its drying kinetics data.

The phase change energy storage mortar has good thermal performance and energy storage and temperature regulation capability while meeting the requirements of mechanical properties, which has ...

In addition, this study also analyzes whether a biochar-mortar composite serves as a functional building material, improves the thermal performance, mitigates moisture problems, and ...

In the article there are introduced tests of three mortars (cement, cement with plasticizer, and cement-lime based) formed in wall joints. In order to prepare mortar samples from joints of wall ...

Integrating phase change materials (PCMs) into building materials has gained attention for enhancing thermal performance and energy efficiency. However, the impact of different PCM ...

This study evaluates the influence of different cardinal directions considering temperature and rain moisture for facades of buildings located in the city of Santa Maria, Brazil, ...

The building envelopes which may seem to be consuming more energy can be modified by tailoring the construction materials, such as mortar, with heat storage materials for regulating the indoor ...

Consequently, the fabricated novel cement mortar produced with superior thermal and mechanical characteristics has a significant potential for the thermal regulation and energy conservation in ...

First, the compressive strength of cement mortar was evaluated with the inclusion of the waste glass powder and the ultra-fine GGBS. Afterward, the different temperature exposures for all ...

The average activation energy obtained expressed the temperature effect on the mortar diffusivity. The drying constant and the diffusion coefficient can be used to predict the influence of these ...

The microstructure, mechanical properties, thermal properties and temperature control properties of energy storage mortars with different PD-PCM dosages (5%-20%) were investigated ...

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How do building elements store thermal energy? To overcome these drawbacks of sensible thermal energy storage, the building elements are embedded with PCM. PCM stores thermal energy in latent ...

This study delves into the role of phase change materials (PCMs) in bolstering energy efficiency, particularly in response to escalating global energy consumption in construction.

However, this study did not consider the differential effects of biochar pyrolysis temperatures on the performance of cement mortar under ACC conditions, as well as its potential for ...

Advancing thermal control in buildings with innovative cementitious mortar and recycled expanded glass/n-octadecane phase change material composites Ali Yaras a, Muhammed Bayram b ...

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