

# ADVANTAGES OF BUILDING ENERGY STORAGE AND TEMPERATURE REGULATING MORTAR



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).



How to increase thermal energy storage capacity of building elements? The combination of building materials with PCMs is an efficient way to increase the thermal energy storage capacity of construction elements. Thereby, wallboards, floors, roof, concrete and other parts are integrated with PCMs in order to improve the thermal performance of the building.



What is the heat storage coefficient of PCM mortar? It was concluded that 20% PCM combination has resulted in a mortar suitable for building applications. The heat storage coefficient for composite PCM based mortar is 1.74 times the ordinary mortar, indicating the superior heat storage property of PCM based mortar.



Do mortars need a high mechanical strength? For such a reason, the research has moved towards the investigation on mortars for interior and/or exterior coatings, where high values of mechanical strength are not required.



Do PCM mortars reduce energy costs? On the basis of numerical or experimental simulations, the energy costs, related to the capability of the mortars containing PCMs to decrease the heating and cooling needs (by increasing the minimum temperatures and decreasing the maximum temperatures), have been estimated to decrease by 10???50%[74,107], depending on the simulated season.

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Can phase-change materials be used in mortars? PCMs in Mortars: Potential and Issues The incorporation of phase-change materials in mortars employed in the interiors of buildings appears the most attractive solution in an attempt to minimize the massive energetic consumption related to building conditioning.



The phase change material (PCM)-based thermal energy storage (TES) is one among the efficient technologies available, which seems viable to cater to the end-use energy ???



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



The operating principle of PCMs takes advantage of the modification of their state due to changes in temperature: as the temperature increases, the PCM passes from the solid to the liquid ???



Cement mortar: Temperature increasing rate from 3.6 °C/min to 1.6 °C/min (EP100) [104] Cement mortar: Latent heat of 19 kJ/kg [42] Cement mortar: Latent heat up to 21.3 kJ/kg ???

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Currently, more than 45% of electricity consumption in U.S. buildings is used to meet thermal uses like air conditioning and water heating. TES systems can improve energy reliability in our nation's building stock, lower utility bills ???



The final mortar has many advantages such as excellent mechanical performance, small drying shrinkage, high fire resistance, superior acid resistance and significant reduction ???