

Dear Colleagues, We are pleased to invite you to submit your work to this Special Issue of Coatings on "Micro/Nanomaterials for Heat Transfer, Energy Storage and Conversion".. Micro/Nanomaterials are known to exhibit a number of interesting physical properties with excellent performance in the fields of heat transfer, energy conversion and ...

This, however, may require coating of such low grade locally available material in order for them to withstand the corrosive nature of high temperature PCMs. This is left as food for thought for CSP applications. ... Low temperature latent heat thermal energy storage: heat storage materials. Sol Energy, 30 (4) (1983), pp. 313-332. [View PDF](#) [View ...](#)

1) sensible heat (e.g., chilled water/fluid or hot water storage), 2) latent heat (e.g., ice storage), and 3) thermo-chemical energy. 5. For CHP, the most common types of TES are sensible heat and latent heat. The following sections are focused on Cool TES, which utilizes chilled water and ice storage. Several companies have commer-

Flame-retardant wood-based composite phase change materials based on PDMS/expanded graphite coating for efficient solar-to-thermal energy storage. Author links open overlay panel Xunhe Deng a, Cong Li a, Xiaohan Sun a, Chengyu Wang a, Baosheng Liu b, Yudong Li a, Haiyue Yang a. ... which affects the heat transfer and energy storage of materials.

DFs can adsorb as much as 65 wt % BW without leakage, accompanied with a high heat storage capacity of 112.57 J/g. The thermal stability test demonstrates that the DF/BW coating can undergo 500 heating-freezing cycles with the reduction of ...

The heat-storage coatings from ethylene vinyl acetate (EVA) copolymers were developed by incorporating in-situ synthesized phase change nano-capsules (NEPCMs). The coatings were applied to the interior walls of the building, aimed at enhancing thermal storage and flame-retardant performances. Fourier transform infrared spectroscopy (FTIR) and X-ray ...

Thermochemical energy storage (TCES) presents a promising method for energy storage due to its high storage density and capacity for long-term storage. A combination of TCES and district heating networks exhibits an appealing alternative to natural gas boilers, particularly through the utilisation of industrial waste heat to achieve the UK government's ...

In general, TES consist of a thermal energy storage medium and a closed circuit heating-cooling system. The heat storage in the TES storage media can be efficiently achieved using the latent heat upon phase change [5], [6], [10], [11]. The latent heat storage method has attracted great interest due to the fact that high density

energy storage ...

Thermal energy storage (TES) is a technology that stocks thermal energy by heating or cooling a storage medium so that the stored energy can be used at a later time for heating and cooling applications and power generation. TES systems are used particularly in buildings and in industrial processes. This paper is focused on TES technologies that provide a way of ...

Moreover, upon coating the film with nanometer layers of Al_2O_3 , the E b and electrostatic energy storage performance is further augmented, giving rise to a high discharged energy density (U_d) of 8.64 J cm^{-3} obtained at 750 MV m^{-1} and 150°C , which to the best of our knowledge, exceeds the performance of the known free-standing film ...

A widely exploited method to control and modify the radiative heat transfer in high temperature application is to tune the surface optical properties by applying specific coatings [10] the CSP industry, specific solar selective coatings have been developed to enhance the solar absorption and the receiver performances [11, 12]. Pyromark 2500 has been exploited in ...

The sensible heat of molten salt is also used for storing solar energy at a high temperature, [10] termed molten-salt technology or molten salt energy storage (MSES). Molten salts can be employed as a thermal energy storage method to retain thermal energy. Presently, this is a commercially used technology to store the heat collected by concentrated solar power (e.g., ...

By preparing a series of bisphenol resin polymer films with different crosslinking degrees and comparing their properties, our group confirmed the promising possibility of epoxy materials ...

New energy-saving building developed by using polyethylene glycol/halloysite nanotube energy-storage blanket and heat-insulating glass with $\text{Na}_x\text{WO}_3/\text{SiO}_2$ nano-coating Author links open overlay panel Lihua Peng a, Ziqing Xu a, Luomeng Chao b, Dapeng Zheng a, Haibin Yang a, Changwei Sun b, Hongzhi Cui a

In this study, the main goal was to develop an adsorption heat storage system for domestic heating system gained by solar collectors and to indicate a new way of maintaining the energy.

A review of phase change material and performance enhancement method for latent heat storage system. Renew Sust Energ Rev, 93 (2018), pp. 245-259. View PDF View article View in ... Fast Self-Healing Superhydrophobic Thermal Energy Storage Coatings Fabricated by Bio-Based Beeswax and Artificially Cultivated Diatom Frustules. ACS Appl Mater ...

The composite heat energy storage consists of sensible and latent heat energy storage (paraffin wax and beach sand). The composition of beach sand varied from 0 to 100 %. The thermal conductivity results of composite heat energy storage reveal that increasing the composition of beach sand beyond 50 % results in a reduction in

thermal conductivity.

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There are three forms of heat energy storage: sensible heat storage, latent heat storage and thermochemical heat storage. ... Subsequently, Sol-gel coating treatment as well as thermal oxidation treatment at high temperature is carried out to successfully prepare $\text{Al@Al}_2\text{O}_3$ microcapsules with stable core-shell structure. Their microscopic ...

Since 2005, when the Kyoto protocol entered into force [1], there has been a great deal of activity in the field of renewables and energy use reduction. One of the most important areas is the use of energy in buildings since space heating and cooling account for 30-45% of the total final energy consumption with different percentages from country to country [2] and 40% in the European ...

1 Introduction. Electrostatic capacitors have the advantages of high power density, very fast discharge speed (microsecond level), and long cycle life compared to the batteries and supercapacitors, being indispensable energy storage devices in advanced electronic devices and power equipment, such as new energy vehicle inverters, high pulse nuclear ...

Transparent heat-insulation glass (HIG) with a highly selective light-absorbing coating and an energy-storage blanket (ESB) loaded with phase change materials show considerable potential in reducing building energy consumption. However, the energy-saving effect of a single material is usually not ideal, and the instability of HIG and ESB limits their ...

Sensible heat storage (SHS) involves heating a solid or liquid to store thermal energy, considering specific heat and temperature variations during phase change processes. Water is commonly used in SHS due to its abundance and high specific heat, while other substances like oils, molten salts, and liquid metals are employed at temperatures ...

Enhanced thermal conductivity of a superhydrophobic thermal energy storage coating based on artificially cultured diatom frustules. Author links open overlay panel Dandan Li 1, Haoyang Sun 1, Tao Li, Meng Yang, Tiancheng Xiong, Dazhi Sun. ... The present study investigates the potential of latent heat storage using phase change materials (PCMs) ...

thermal energy storage coating is realized by spraying mesoporous superhydro-phobic C@SiO_2 -HDTMS nanotubes (NTs), industrial paraffin wax (IPW), and ethyl α -cyanoacrylate (ECA) onto ...

Multifunctional phase change materials-based thermal energy storage technology is an important way to save

energy by capturing huge amounts of thermal energy during solar irradiation and releasing it when needed. Herein, superhydrophobic thermal energy storage coating is realized by spraying mesoporous superhydro-

A report has been published recently that graphene quantum dots (GQDs) were successfully coated on the surface of LiCoO_2 particles by a liquid-phase method. According to the report, it has been shown that GQDs coating not only enhances the stability of LiCoO_2 structure, but also effectively upgrade the rate capacity, cycling performance, and thermal ...

Compared with sensible heat storage, latent heat storage can provide higher energy density and an isothermal heat storage process (Khan et al., 2016; Wang et al., 2016; Wu et al., 2020).

The STES coating has both great phase change behaviors and remarkable superhydrophobic properties to resist the erosion of the natural environment, which will pave the way for its application in practice. We propose a facile and effective route for large-scale fabrication of a superhydrophobic thermal energy storage (STES) sprayable coating with heat storage ...

The management of energy consumption in the building sector is of crucial concern for modern societies. Fossil fuels' reduced availability, along with the environmental implications they cause, emphasize the necessity for the development of new technologies using renewable energy resources. Taking into account the growing resource shortages, as well as ...

The flame-retardant performance of heat-storage coatings was verified by comparing conventional coatings, heat-storage coatings, and organic heat-storage coatings. Fig. 6 (a-d) illustrates the time-dependent curves for heat release rate (HRR), total heat release rate (THR), CO generation, and CO_2 generation.

Enhancing the energy storage properties of dielectric polymer capacitor films through composite materials has gained widespread recognition. Among the various strategies for improving dielectric materials, nanoscale coatings that create structurally controlled multiphase polymeric films have shown great promise. This approach has garnered considerable attention in recent ...

The purpose of this Special Issue is to provide a platform for publishing and sharing the latest advances in micro/nanomaterials for heat transfer, energy storage and conversion, and to promote further research on energy storage, heat transfer enhancement, solar energy harvesting, radiative cooling, two-dimensional materials, etc., so as to ...

Solar-thermal energy storage using latent heat of phase change materials (PCMs) offers renewable penetration in wide range of smart applications. ... Further, coating of developed solar heat storage material on fabric substrate has shown promising results toward real world applications. Graphical abstract. Download: Download high-res image (238KB)

The enhanced energy storage and release performance after TiO_2 coating is attributed to the formation of the

Energy storage heating coating

double-shell coating structure on AlH_3 consisted by inert Al_2O_3 and catalytic TiO_2 coatings, which simultaneously slows down the diffusion of hydrogen atoms in the induction period of AlH_3 decomposition and accelerates the release ...

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