Heat transfer method of graphite solar container materials

Can magnesium sulfate and expanded graphite be used as thermochemical storage materials?
In this paper,we report a novel thermochemical storage composite material,consisting of magnesium sulfate (MgSO 4,the thermochemical storage material) and expanded graphite (EG,heat transfer enhancer and structural stabiliser),prepared by impregnation of MgSO 4 into EG.

How does thermal energy storage improve the productivity of solar collectors?
Thermal energy storage improves the productivity of solar collectors. Phase change materials(PCM) are employed to store thermal energy in solar collectors,heat pumps,heat recovery,hot and cold storage. PCMs are encapsulated primarily in shell-and-tube,cylindrical,triplex-tube,spherical,rectangular,and trapezoidal containers.

Does phase change material melt in a solar vertical thermal energy storage?
Melting behavior of phase change material in a solar vertical thermal energy storage with variable length fins added on the heat transfer tube surfaces Int. J. Renew. Energy Dev., 9 (3) (2020), pp. 361 - 367, 10.14710/ijred.2020.29879

How does heat transfer affect the thermal conductivity of composite materials?
For example, during the preparation process, the thermal conductivity network of the composite material is destroyed, resulting in a limited improvement in the thermal conductivity of the composite material. In addition, little research has been conducted on the heat transfer and thermal conduction processes of composite materials.

Are PCM container designs practical for solar thermal storage?
PCM container geometry and orientations are practicalpassive heat transfer enhancement techniques in the long-term compared to adding nanoparticles and attaching fins. This review focuses on significant aspects of PCM container designs for practical solar thermal storage.

Why is graphite bulk a 3D structure?
In this work,graphite bulk (the graphitized bulk) with a 3D structure is prepared by rolling up the graphene layers to optimize heat transferand improve mechanical properties. On the one hand,the heat can transfer within three-dimensional space,which can help to optimize the heat transfer of the cross-plane direction of graphite.

However, these materials do face the primary challenge of low thermal conductivity which necessitates incorporation of heat transfer enhancement techniques. Heat transfer ...

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Various methods to enhance heat transfer in the PCM have been used in the practical LTES systems [3], such as embedding fins in the PCM to increase the heat transfer surfaces, ...

Effective integration of the latent heat thermal energy storage system with solar thermal collectors depends on heat storage materials and heat exchangers. The practical limitation of ...

A latent heat thermal energy storage (LHTES) system, consisting of a tank filled with a phase-change material and pipes carrying a heat transfer fluid, for a concentrated solar power plant ...

This composite PCM uses a cross-linked mixture of paraffin wax and an olefin block copolymer as the base material and expanded graphite as the thermally conductive filler. The ...

Heat transfer during solid-liquid phase change, i.e., melting and solidification, has long been studied with applications to thermal energy storage (TES) by means of phase change materials ...

B S T R A C T Keywords: Containment materials Liquid tin heat transfer uid fl High temperature (1350°C) Concentrated solar power One pathway for reducing the cost of concentrated ...

The high-temperature container materials that are able to resist the aggressive chemical behavior of the molten salts used in NGNP are basically high-temperature alloys (some stainless steels, Inconel, and ...

It is urgent to create heat-dissipation materials with high thermal conductivity, light weight and good machinability. Carbon-based materials with a highly oriented lamellar structure could ...

Abstract In this work, thermal properties of five phase change materials (PCMs) with medium phase change temperature including mannitol, sebacic acid (SA), SA/expanded graphite ...

PCM container geometry and orientations are practical passive heat transfer enhancement techniques in the long-term compared to adding nanoparticles and attaching fins. This ...

To enhance heat transfer of erythritol in a direct contact thermal energy storage (TES) container, expanded graphite (EG) was used as additives. Composite PCMs with 1 wt%, 2 wt%, 3 ...

The choice of PCM containers and geometry mainly depends on the applications and various heat transfer enhancement methods. The significant conclusions based on the PCM ...

This work proposed a method to reduce the area of photothermal surfaces through applying light concentration techniques and a directional thermo-conductive framework, with the aim ...

In this work, graphite bulk (the graphitized bulk) with a 3D structure is prepared by rolling up the graphene

layers to optimize heat transfer and improve mechanical properties.

Three methods to enhance the heat transfer in a cold storage working with water/ice as PCM are compared: addition of stainless steel pieces, copper pieces and a new PCM-graphite ...

In this paper, the feasibility of using metal foams to enhance the heat transfer capability of phase change materials (PCMs) in low- and high-temperature thermal energy storage systems ...

This work indicates that graphite, silicon carbide, and/or mullite can serve as effective containment materials for the use of tin-based liquids as heat transfer fluids operating at 1350 °C in ...

Artificial structures with novel thermal properties are promising for heat-transfer applications. This Review provides an overview of thermal metamaterials and devices, discussing the ...

In this paper, the feasibility of using metal foams and expanded graphite to enhance the heat transfer capability of PCMs in high temperature thermal energy storage systems is investigated.

Mesophase pitch based graphite foams (GFs) with different thermal properties and pore-size were used to increase the thermal diffusivity of phase change material (PCM), paraffin wax, for ...

Abstract The high-temperature solar coatings and heat transfer fluids play a key role in increasing the performance of concentrating solar power (CSP)/desalination plant. In this paper, the ...

In this work, a novel anti-leakage, form-stable composite PCM with enhanced thermal conductivity was successfully proposed. This composite PCM uses a cross-linked mixture of paraffin ...

In this paper, we report a novel thermochemical storage composite material, consisting of magnesium sulfate (MgSO 4, the thermochemical storage material) and expanded graphite (EG, ...

Five different EG contents of MEG/APSD composite PCM samples with the same density have been prepared by the method of "melting blend-solidification and form-stable". In ...

This study aims to experimentally investigate the impact of graphite powder on the thermal characteristics and heat transfer performance of paraffin with ceresin (PC) as a PCM, using ...

The simulation and application data confirm that EG has obvious heat transfer reinforcement effects in thermal management and thermal energy storage systems. KEYWORDS: expanded graphite, phase ...

To solve this problem, several methods to enhance heat transfer have been reported in the literatures, such as: (1) adding nanomaterials [28, 29]; (2) using carbon-based or metal porous ...

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