

Copper foam plus phase change solar container





Overview

In the current work, new shape-stabilized phase change composite materials are designed, which can integrate high solar energy absorption, heat storage and thermal conductivity. In this study, copper foam is used to increase the thermal characteristics of the paraffin. Solar energy absorption and storage have attracted extensive attention and a number of potential phase change materials have been reported. Extensive research suggests that enhancing heat transfer (HTE) in storage systems is.



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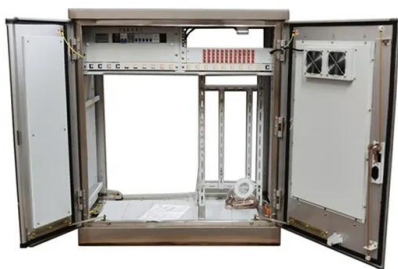


Coral-like carbon modified copper foam reinforced phase change

Flexible copper foam-based phase change materials with good stiffness-toughness balance, electro-to-thermal conversion ability and shape memory function for intelligent thermal ...

Numerical investigation of the effects of a copper foam ...

The study indicates that incorporating copper foam as a porous medium enhances thermal performance, improving overall system efficiency by up to 15% ...



Form-Stable Composite Phase Change Materials Based on Porous Copper

Solar-thermal energy conversion and storage technology has attracted great interest in the past few decades. Phase change materials (PCMs), by storing and releasing solar energy, are ...

Heat Transfer Enhancements Assessment in Hot Water Generation ...

Extensive research suggests that enhancing heat transfer (HTE) in storage systems is crucial for



achieving these improvements. This review employs a bibliometric analysis to track the ...



Copper foam reinforced polymer-based phase change material ...

Abstract In this study, copper foam reinforced polymer-based composite phase change materials (CPCM) were prepared to solve the problems of low thermal conductivity, melting leakage, ...

Solar to Thermal Energy Storage Performance of Phase Change ...

Thermal Energy Storage (TES) using Phase Change Material (PCM) has evolved as one of the sustainable technique of storing the excess amount of heat and utilizing it as and when required.



Influence of Copper Foam on the Thermal Characteristics of Phase ...

In this study, copper foam is used to increase the thermal characteristics of the paraffin. Simulations are conducted to compare the melting characteristics of the pure paraffin and the ...



Enhanced solar thermal energy storage of phase change ...

To address these challenges, this study introduces a novel phase change composite by integrating copper foam modified with metal-organic framework-derived multi-walled carbon ...



Enhanced solar thermal energy storage of phase change composites

In this study, copper foam reinforced polymer-based composite phase change materials (CPCM) were prepared to solve the problems of low thermal conductivity, melting leakage, and poor

Solar to thermal energy storage performance of composite phase change

Solar to thermal energy storage performance of composite phase change material supported by copper foam loaded with graphite and boron nitride Krishna Kumar Gupta a, ...



Enhanced solar thermal energy storage of phase change composites

Download Citation , On Mar 1, 2025, Pan Guo and others published Enhanced solar thermal energy storage of phase change composites supported by copper foam modified with metal-organic ...



Coral-like carbon modified copper foam reinforced phase change

To enhance the thermal conductivity, shape stability, and solar-thermal conversion of organic phase change materials (PCMs), specifically paraffin wax (PW), this study examined the ...



Form-stable paraffin/graphene aerogel/copper foam composite phase

Sustainable utilization of solar energy with a more compact solar heating system is a significant research. In this study, a novel form-stable composite phase change material (PCM) was ...

Enhancement of solar thermal storage properties of phase change

Metallic foams, especially copper foams (CF), have been investigated to solve the problems of leaking and low thermal conductivity of phase change materials (PCMs), which helps to promote the ...



Metal foam-phase change material composites for thermal energy storage

As opposed to sensible heat storage approach, by going through melting/solidification phase change processes, PCMs can store/release thermal energy in the form of latent heat [3].



Solar to Thermal Energy Storage Performance of Phase Change ...

Additionally, Solar to thermal conversion performance and surface temperature profile was also observed for all the samples of copper foam loaded with paraffin and graphite. The results indicate ...



Stearic Acid/Copper Foam as Composite Phase Change Materials for

Stearic acid (SA) was blended with copper foam (CF) of pore numbers per inch (PPI) of 5, 20, and 40 to prepare composite phase change materials via a molten impregnation method. The ...

Form-Stable Composite Phase Change Materials Based on Porous ...

In this work, new form-stable solar thermal storage materials by impregnating paraffin PCMs within porous copper-graphene (G-Cu) heterostructures were designed, which integrated ...



Numerical investigation of the effects of a copper foam filled with

Zhou and Zhao [19] utilized the phase field method to analyze the heat transfer of phase change material in a metal foam. Krishnan et al. [20] presented a two-temperature model to evaluate ...



Enhanced solar still operation using a copper coil heat exchanger and

To further optimize performance, a phase change material (PCM) is integrated into the design. The PCM, strategically positioned beneath the absorber, stores excess energy during ...



Enhanced solar still operation using a copper coil heat exchanger and

Request PDF , On Mar 1, 2025, Umar F. Alqsair and others published Enhanced solar still operation using a copper coil heat exchanger and phase change material integration , Find, read and cite all

Experimental study of a phase change thermal energy storage with copper

In this paper, a copper foam is implemented in a shell-and-tube heat exchanger as phase change thermal energy storage unit and studied experimentally. Visualization enables the ...



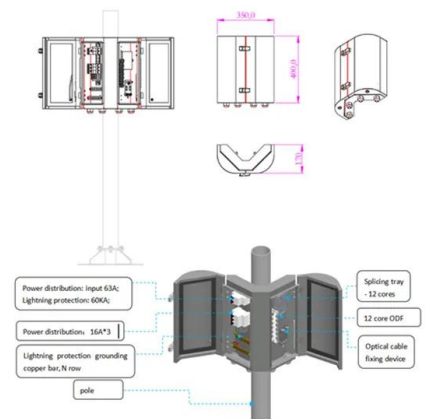
Enhancing PV Cell's electrical efficiency using phase change material

The results show that against the panel with no phase change material method (1), the cell's temperature in the panel with phase change material/copper foam matrix and 0.20% multi ...



Experimental and numerical investigations of an open-cell copper foam

Small satellites' thermal control in the space environment is crucial. Phase change materials (PCM) are promising options for satellite thermal management in space thermal conditions. ...



An innovative approach for the passive cooling of batteries: An

A proof-of-concept utilising Copper-Plated Polyurethane Foam (CPPF) and Phase Change Material (PCM) for passive thermal management of lithium-ion batteries is demonstrated in this ...

Pine needle-like hierarchical copper foam-based high-performance ...

In summary, this work successfully developed Cu foam-based phase change composites with a pine needle-like structure, overcoming multiple challenges traditional PCMs face in practical ...



3D porous copper foam-based shape-stabilized composite phase change

Solar energy absorption and storage have attracted extensive attention and a number of potential phase change materials have been reported. In the current work, new shape-stabilized ...





3D porous copper foam-based shape-stabilized composite phase ...

Our approach not only provides a new way for facile manufacturing of high-performance composite phase change materials, but also integrates the processes of solar energy utilization, which exhibit ...



Numerical investigation of the effects of a copper foam filled with

Request PDF , On May 1, 2018, Soroush Mousavi and others published Numerical investigation of the effects of a copper foam filled with phase change materials in a water-cooled photovoltaic/thermal

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