Stearic acid lauric acid thermal energy storage

Can stearic acid/expanded perlite composite be used for thermal energy storage?
The composite PCMs present good potential applicationsfor thermal energy storage and conservation in buildings mainly due to their high latent heat and a suitable melting temperature. Preparation and properties of lauric acid - stearic acid/expanded perlite composite as phase change materials for thermal energy storage.

How are stearic acid and lauric acid determined?
3 stearic acid,lauric acid,and their binary mixtures will be experimentally determined from the Heat Flow vs. Temperature measurement,using Differential Scanning Calorimetry (DSC). The TES systems may be classified into three types,(1) Sensible Heat Storage 1,2 (2) Latent Heat Storage and (3) Thermochemical Storage.

What is lauric acid - stearic acid/expanded perlite composite?
Preparation and properties of lauric acid - stearic acid/expanded perlite composite as phase change materials for thermal energy storage. /expanded perlite (EP) were prepared by vacuum impregnation. ? The melting temperature of LA-SA /EP is about 33.0 °C and the latent heat is 131.3 /1. Introduction

How do you measure a stearic / lauric acid mixture?
Measure the thermal characteristics [Heat Capacity,Latent Heat of Fusion,and Melting Temperature]of stearic /lauric acid mixtures using Differential Scanning Calorimetry. Plot a graph of Melting Temperature vs. % Composition of acid components in the mixture. Such a plot illustrates the Phase Diagram for the acid mixture.

Can stearic acid be used as a phase change material?
Stearic acid (SA) is being used as phase change material(PCM) in energy storage applications. In the present study,the microencapsulation of SA with SiO 2 shell was carried out by sol-gel method. Different amounts of SA (5,10,15,20,30 and 50 g) were taken against 10 ml of tetraethyl orthosilicate (TEOS) for encapsulation.

How do you mix lauric acid and stearic acid?
Weigh appropriate amounts of lauric acid and stearic acid of the desired composition to make 100 mg of the mixture. Transfer the mixture into a vial and heat it on a hotplate to approximately, 100 ?C until a homogenous solution is formed. Turn off the hotplate and cool the solution to room temperature.

for thermal energy storage which is composed of lauric acid and stearic acid(LA-SA) and, as it will be shown in Section 2, it is positioned vertically and horizontally in a heat exchanger. Different mass ratios of LA-SA eutectic mixtures were prepared, and their thermal properties were firstly characterized by DSC.

Fly ash includes different mineral phases. This paper reported on the preparation of a novel lauric acid

(LA)/fly ash (FA) composite by vacuum impregnation as a form-stable phase change material (PCM) for thermal energy, and especially investigated the effect of the hydrochloric acid-treated fly ash (FAh) on the thermal energy storage performance of the ...

In order to obtain the suitable phase change material (PCM) with low phase change temperature and improve its heat transfer rate, experimental investigation was conducted. Firstly, different mass ratios of lauric acid (LA) and stearic acid(SA) eutectic mixtures were prepared and characterized by differential scanning calorimetry (DSC). Then, the performance of eutectic ...

3 days ago· Experimental evaluation of energy storage and hydration of lauric acid/expanded vermiculite composite phase change cementitious materials. Author links open ... Effect of carbon nanotubes on the thermal behavior of palmitic-stearic acid eutectic mixtures as phase change materials for energy storage[J] Solar Energy, 110 (2014), pp. 64-70. View ...

He, J. Zhou and X. Liang, Development of capric acid-stearic acid-palmitic acid low-eutectic phase change material with expanded graphite for thermal energy storage, Constr. Build. Mater., 2022, 320, 126309 CrossRef CAS .

Thermogravimetric analysis (TGA) was used to analyze the thermal decomposition of the samples; the test temperature range was from 30 to 400 °C, with a heating rate of 10 °C min-1, and a nitrogen flow rate of 100 ml min-1.

The energy is delivered over a narrow temperature range making these materials attractive for smaller and lighter storage devices and lower storage losses. 2 1,4 o PLEASE REFER TO THE HANDOUTS FOR A LIST OF THE DESIRABLE PROPERTIES OF PHASE CHANGE MATERIALS RELEVANT TO ENERGY STORAGE] MATERIALS: Lauric acid [12-Carbon acid] ...

Then, the matrix was used to stabilize binary lauric-stearic acid of LA-SA for the preparation of diatomite-based composite phase change material which is used to explore the application of composite in photo-to-thermal conversion/storage. Results show that the carbon-decorated process on diatomite causes an increment of specific surface area ...

In this study, a capric acid (CA)-stearic acid (SA)/expanded graphite (EG) composite phase change material (PCM) was prepared, and the optimum mass ratio of CA-SA is 0.84:0.16. The composite PCM was characterized by scanning electron microscopy, differential scanning calorimetry, and X-ray diffraction. It can be concluded that the CA-SA mixture was found to ...

Preparation and thermal properties of n-octadecane/stearic acid eutectic mixtures with hexagonal boron nitride as phase change materials for thermal energy storage Energy Build., 131 (2016), pp. 35 - 41, 10.1016/j.enbuild.2016.09.022

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The PCM is divided into solid-liquid, solid-solid, solid-gas and liquid-gas phase change PCM according to the different phase change processes [13].Within these, solid-liquid PCM has the benefits of high thermal storage density and small volume variation in the phase change process and is currently the most widely used PCM [14].Solid-liquid PCM can be ...

Most phase change materials developed in current research have high phase change temperatures, making them challenging to use in buildings. To solve this problem, the microencapsulated phase change materials (MPCMs) with low eutectic temperature were prepared by interfacial polymerization using binary eutectic of lauric acid (LA) and stearic acid ...

Development of capric acid-stearic acid-palmitic acid low-eutectic phase change material with expanded graphite for thermal energy storage Construct. Build Mater., 320 (2022), Article 126309, 10.1016/j nbuildmat.2022.126309

With the continuous development of cities and society, the issue of energy consumption have gained significant importance and cannot be ignored [1, 2].Thermal energy storage (TES) has emerged as a promising solution for conserving energy and mitigating environmental pollution [[3], [4], [5]].Among the various strategies, the use of phase change ...

Thermal energy storage (TES) is an effective energy saving method that includes sensible thermal energy storage, latent thermal energy storage, and reversible chemical reaction energy storage [1]. ... Similarly, Baskar et al. [27] added nano-SiO 2 to the lauric acid-stearic acid matrix and found that thermal conductivity increased by 47.25 % ...

CNTs also enhanced the diffusion coefficient of lauric acid PCM composites, increasing energy flux and thermal conductivity compared to pure lauric acid at the same temperature. These findings suggest that CNTs can enhance the heat and mass transfer of lauric acid [175] .

All results indicated that the prepared lauric-palmitic-stearic acid ternary eutectic mixture/vermiculite form-stable composite phase change material had suitable thermal properties and good thermal reliability for the application of thermal energy ...

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