

Solid paraffin was encapsulated by water-dispersible  $\text{Si}_3\text{N}_4$  nanoparticles (nano- $\text{Si}_3\text{N}_4$ ) functionalized with amphiphilic polymer chains using an eco-friendly Pickering emulsion route to prepare a sort of composite phase change materials (PCMs) for thermal energy storage. In this method, the oil phase of melted paraffin and monomers could be easily encapsulated ...

Highly conductive nanoparticles were proposed to be dispersed into phase change materials (PCMs) such as paraffin wax for heat transfer enhancement. The mixture, often referred to as nanoparticle-enhanced phase change material (NePCM), has been studied extensively for latent heat energy storage but with conflicting results. This study attempts to ...

Phase change Material (PCM) has immense potential in the field of energy storage due to its latent heat capacity. In this study, accelerated thermal cycling is performed on Paraffin wax (PW) and Paraffin Wax/Polyaniline (PWP-1) composite up to ...

A significant amount of heat is wasted in manufacturing process, electricity generation, chemical and industrial process. Recovery and reuse of this energy through storage can be useful in conservation of energy. In the present study, a double pipe type heat exchanger has been designed and fabricated for low temperature industrial waste heat recovery using phase ...

17th International Conference on Environmental Science and Technology Athens, Greece, 1 to 4 September 2021 CEST2021\_00801 Utilization of paraffin wax as phase change material for solar thermal energy storage Shalaby S. M.1,\*, Kabeel A. E.2, Fleafl A. H.1 1 Engineering Physics and Mathematics Department, Faculty of Engineering, Tanta University, Tanta 31511, Egypt.

Using paraffin wax, we demonstrate effective energy density and power density of  $230 \text{ J cm}^{-3}$  and  $0.8 \text{ W cm}^{-3}$ , respectively. ... The performance of thermal energy storage based on phase change ...

A tradeoff between high thermal conductivity and large thermal capacity for most organic phase change materials (PCMs) is of critical significance for the development of many thermal energy storage applications. Herein, unusual composite PCMs with simultaneously enhanced thermal conductivity and thermal capacity were prepared by loading expanded ...

Journal of Chemical and Petroleum Engineering, 2016. The present work deals with an experimental investigation of charging and discharging processes in thermal storage system using a phase change material PCM.

A good way to store thermal energy is by using a phase-change material (PCM) such as wax. Heat up a solid

piece of wax, and it'll gradually get warmer--until it begins to melt. As it transitions ...

Paraffin wax have been widely used for latent heat thermal energy storage system (LHTES) applications due to large latent heat and desirable thermal characteristics such as little or no super cooling, varied phase change temperature, low vapor pressure in the melt, good thermal and chemical stability and self nucleating behavior

Paraffin waxes are organic phase change materials possessing a great potential to store and release thermal energy. The reversible solid-liquid phase change phenomenon is the under-lying mechanism enabling the paraffin waxes as robust thermal reservoirs based on inherently high latent heat (i.e., ~200-250 J/g). However, the main drawback of paraffin waxes ...

containing M3 paraffin wax as phase change material for thermal energy storage embedded in a polypropylene (PP) matrix. Blends of PP/PS:wax and PP/PS were prepared without and with SEBS as a modifier. The influence of PS and PS:wax microcapsules on the morphology and thermal, mechanical and conductivity properties of the PP was investigated ...

Hence, the thermal energy storage system is required to be integrated into the existing solar thermal conversion technologies. Owing to high energy storage density within a narrow range of temperature, a phase change material (PCM) based thermal energy storage system is a viable solution for the same [1, 2]. Paraffin wax, owing to its good ...

Organic phase change materials (PCM) such as paraffin wax have lower thermal conductivity, compromising the rate of heat transfer during charging and discharging. This work reports the improvement of the thermal conductivity of paraffin wax through dispersion of ZnO nanoparticles and its outcome in terms of heat transfer performance. ZnO-paraffin wax ...

This Thermal Energy Storage (TES) was further classified based on the ability to store heat into Sensible Heat Storage (SHS), chemical storage, and Latent Heat Storage (LHS) (Lee et al., 2019). Moreover, the most used TES is the Phase Change Material (PCM) which is a material that undergoes a phase change process at a specific working temperature.

Paraffin natural wax 811: 82-86: 85: 0.72 (solid) Paraffin natural wax 106: 101-108: 80: 0.65 (solid) Table 2. ... Farid MM, Khudhair AM, et al. A review on phase change energy storage: Materials and applications. Energy Conversion and Management. 2004; 45 (9-10):1597-1615; 8. Li WD, Ding EY. Preparation and characterization of crosslinking ...

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