

<div class="df_qntext">Which silicone oil fluid is best for solar illumination?

Among the silicone oil fluids with three different loadings of hybrid NPs, the C2 fluid has the good combination of high optical absorption and stable dispersion under different testing temperatures, and can stably harvest solar illumination at 100 °C.

<div class="df_qntext">Can nanofluids be used in solar collectors?

Multiple requests from the same IP address are counted as one view. The integration of nanofluids into solar collectors has gained increasing attention due to their potential to enhance heat transfer and support the transition toward low-carbon energy systems.

<div class="df_qntext">What is photothermal conversion?

Photothermal conversion, a key technology in solar energy utilization, accounts for approximately 70% of solar energy applications. Solar collectors, which convert solar radiation into thermal energy, play a central role in photothermal applications.

<div class="df_qntext">How to prepare solar-thermal nanofluids?

The mixture was ultrasonicated for 30 min and then refluxed at 70 °C for 12 h. To prepare solar-thermal nanofluids, the chloroform dispersion of surface-modified Fe₃O₄@graphene was added to the silicone oil fluid (CS350, Linfeng Chemical), followed by heating at 40 °C to remove the chloroform.

<div class="df_qntext">Which nanofluid is best for absorbing solar spectra?

In direct absorption solar collectors, the photothermal conversion efficiency can be ranked from highest to lowest in the order of metal nanofluids, carbon-based nanofluids, metal oxide nanofluids, and non-metal oxide nanofluids. Multivariate nanofluids offer advantages in absorbing solar spectra.

<div class="df_qntext">Do nanofluids improve photothermal conversion efficiency of direct absorption solar collectors?

Comparatively, when nanofluids are prepared from common carbon nanomaterials such as carbon black and soot, the improvement in photothermal conversion efficiency of direct absorption solar collectors is below 100%.

Solar-driven interfacial evaporation (SIE) based on pumping bottom water up to air-water interface for localized heating has raised abundant research interest for clean water production. However, when ...

Effective and practical cleanup of viscous crude oil spills is extremely important in real harsh marine environments. Herein, we designed a solar-driven, nanocellulose-based Janus aerogel ...

Herein, by using Fe₃O₄@graphene hybrid nanoparticles as a model system, we proposed a new method to

prepare stably dispersed silicone oil-based solar-thermal nanofluids that can operate at ...

Solar-heated oil absorbents have recently drawn significant attention [19], [20], [21]. Kuang et al. [22] fabricated a photothermal adsorption material. Based on natural wood, this kind of ...

Through oil spill remediation simulations, the utilization of solar/Joule heating has been verified to significantly enhance the adsorption rate and continuous recovery efficiency of the ...

Comparing the properties of interest for this application, this linear silicone-based fluid has similar thermal conductivity and viscosity compared to the HTF currently in use.

It is a worldwide challenge to achieve an efficient cleaning of heavy oil at ambient temperature. Conventional cleanup methods for high-viscosity oil spills exhibit low absorption ...

The use of nanofluid as working fluids in direct absorption solar collectors can increase the absorbance and extinction coefficient and decrease the transmittance of the base fluid, improving ...

Thus, the plasmonic Si NWs have the potential to be used in various fields such as solar photothermal desalination, contaminated water purification, and solar thermoelectric power generation.

Abstract One of the most challenging problems that limit the practical application of carbon-based photothermal nanofluids is their poor dispersion stability and tendency to form aggregation. Herein, ...

Black silicon [6,7] with excellent absorption properties is a potential absorption device for a solar thermal receiver; however, it is too rigid to be attached on the curved surface of the HTF container.

On this basis, photothermal sponge materials possessing distinct super-wettabilities (including isotropic and Janus features) could be facily fabricated and exhibited promising ...

The development of highly efficient membranes for oil-water separation remains a crucial but challenging task. Herein, we present advanced photothermal-responsive fibrous membranes (PVDF ...

Photothermal materials systems convert sustainable solar energy directly into thermal energy [19-21], which reduces the viscosity of heavy oil, thereby facilitating heavy oil flow and improving the efficiency of ...

The uniform dispersion of solar-absorbing MCG particles within silicone oil paves the way for high-performance medium-temperature direct absorption nanofluidic solar-thermal energy ...

Stable dispersion of mesoporous crumpled graphene particles in silicone oil is achieved. The nanofluids have high solar absorbance, large heat capacity and suitable viscosity. ...

Silicone oil photothermal solar container

Multiple structural colors are displayed on broadband photothermal materials. The microstructure of photothermal materials plays a central role in interfacial solar evaporation, which is ...

This study aims at producing novel multi-functional oil/water separation materials, and incorporating the materials to design the lab-scale separator device, which combine both the oil ...

Here, to address these challenges, a straightforward method for synthesizing sunlight-responsive fluidic actuators from off-the-shelf silicone precursors capable of expanding in 3D is ...

Solar-driven membrane distillation (SMD) with local heating of photothermal membranes has shown great potential in the field of seawater desalination due to its low energy consumption, low cost and ...

To this end, improving the efficiency of solar energy technologies is a must. In this work, nanofluids based on a linear silicone-based fluid and Pd nanoparticles were prepared. The ...

Photothermal energy conversion represents a cornerstone process in the renewable energy technologies domain, enabling the capture of solar irradiance and its subsequent ...

Solar-driven evaporation based on photothermal materials is emerging as a sustainable fresh water generation technology for alleviating water scarcity. To realize the efficient and stable ...

Direct absorption solar collectors (DASC) are extremely attractive in solar energy utilization. In this paper, starting from these two aspects, graphene-based nanofluids, including single ...

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