Hollow fiber membrane energy storage

What are the advantages of PP hollow fiber membrane (phfm)?
Therefore,it is necessary to develop a flexible supporting material with high encapsulation capacity and thermal energy storage property. PP hollow fiber membrane (PHFM) fabricated by melt spinning and stretching (MS-S) has many advantages,such as high strength and high porosity.

Are flexible paraffin/multi-walled carbon nanotubes suitable for thermal energy storage?
In this work, a series of novel flexible paraffin/multi-walled carbon nanotubes (MWCNTs)/polypropylene hollow fiber membrane (PHFM) ss-CPCMs (PC-PHFM-CPCMs) with weavability were fabricated for thermal energy storage.

Can pp hollow fiber be used for thermal therapy mask?
Zhang et al. used unstretched PP hollow fiber to prepare flexible paraffin/hollow fiber composite for thermal therapy mask and realized the paraffin adsorption of 82.1 wt%. However, the thermal conductivity of the prepared paraffin/hollow fiber composite was decreased by 55%.

Can smart pp monofilament fiber encapsulate microencapsulated phase change materials?
Iqbal et al. prepared a smart PP monofilament fiber containing microencapsulated phase change materials by melt spinning. The encapsulation capacity and latent heat of smart PP monofilament fiber were only 12%and 9.2 J/g,respectively. However,flexible ss-CPCMs with high encapsulation capacity and high latent heat are more promising.

Why is phfm important for thermal energy storage?
PHFM has porous membrane wall and a columned cavity,which allows high encapsulation capacity of PCMs. The microporous structureof PHFM may be beneficial to the thermal energy storage behavior. Moreover,PHFM shows flexibility and weavability.

Can a finned phase change material storage system improve cost of heat pump operation?
Agyenim F, Hewitt N (2010) The development of a finned phase change material (PCM) storage system to take advantage of off-peak electricity tariff for improvement in cost of heat pump operation. Energy Build 42:1552-1560

Hollow fiber carbon membranes were prepared from the cellulosic precursors by controlling the carbonization protocol of CO 2 using 823-4 K/min for 2 h. The prepared carbon membranes presented a symmetric structure and a much smaller wall thickness of 25 mm compared to the precursor (40 mm) from the SEM images.Single gas (i.e. O 2, N 2, CO 2) ...

Membrane technology has been widely applied in various industries such as medical, chemical, energy, environmental and food industries around the world because it only requires less energy during operation and more importantly it is easier to scale up [1, 2] monly, membrane filtration system is a preferred unit operation

in industrial applications ...

Hollow fiber membranes are attractive as they show several distinct advantages over flat sheet membranes for gas separation, including high surface-to-volume ratio, self-supporting characteristics, and ease to scale up [1], [15] sides, hollow fiber membranes operated under the cross-flow mode display good properties in industrial applications in terms ...

Herein, we have used a hollow fiber membrane as a support layer material to encapsulate paraffin in order to prepare a phase change energy ...

Hollow fiber membranes vibrate and deform under the impinging force of incoming air and the gravity of liquid in the inner tube. In this study, fiber deformation was caused by the pulsating flow of air. With varied pulsating ...

A novel solar energy driven and membrane-based air humidification-dehumidification desalination (MHDD) system is designed and constructed. To realize a water-salt separation, a hollow fiber membrane module is employed as the humidifier to humidify air with solar energy heated saline water. The humidified air is then cooled and condensed to obtain ...

For instance, Wang et al. [78] manufactured highly-asymmetric metallic Ni hollow fiber membranes via a modified phase inversion and sintering technique. Results indicated a maximum hydrogen flux of around 8 times higher than that obtained from the traditional hollow fiber membrane, namely, 73.17 mmol/ (m 2 ·s) at 1000 ?. In the previous work ...

Energy storage capability shows 60.0% of BPA successfully rejected after 120 min of analysis, and thus, PVDF/CuO-VS4 DLHF is a preferential 3-in-1 function photocatalytic ...

The fabricated PVDF asymmetric hollow fiber membranes demonstrated remarkably high fluxes of 3500-8800 ... -ion rechargeable batteries have been considered one of the most promising candidates for large-scale power source and ...

Membrane technology is regarded as one of the key standard technologies for green chemistry and sustainable development, which has been increasingly used for a broad scope of separation and purification processes by reason of its high separation efficiency, low energy consumption, benefits for the economy and the environment, lower investment costs, ...

This study therefore reported for the first time the introduction of an electron energy storage photocatalyst into a DLHF membrane for TOC degradation under both visible light and the dark for memory catalysis. It is also interesting to note that this is the first time a DLHF hollow fiber membrane was fabricated and used for OPW treatment.

Efflux This research study involves the application of - molybdenum trioxide, zinc oxide and graphene oxide (MoO/ZnO/GO) with polyvinylidene fluoride (PVDF) membrane as ...

Herein, we have used a hollow fiber membrane as a support layer material to encapsulate paraffin in order to prepare a phase change energy storage material. The phase change energy ...

Fig. 1 b and c shows the pictures of the membrane reactor and Ru-based catalyst. Synthesis of MFI membrane and modification by catalytic cracking deposition of methyldiethoxysilane was carried out on 1.5 mm Al 2 O 3 hollow fiber support (Media and Process Technology Inc.) according to the literature [36], detailed description about the preparation of ...

Herein, we have used a hollow fiber membrane as a support layer material to encapsulate paraffin in order to prepare a phase change energy storage material.

supplied to the RO membrane, which allows the membrane to operate more efficiently and enhances overall system performance. 2. Advanced and new membrane technologies: New membrane technology is commercially available that increases the membrane surface area and permeability to increase system performance, reducing both energy and water use. 3.

storage property. PP hollow fiber membrane (PHFM) fabricated by melt spinning and stretching (MS-S) has many advantages, such as high strength and high porosity. PHFM has porous membrane wall and a columned cavity, which allows high encapsulation capacity of PCMs. The microporous structure of PHFM may be beneficial to the thermal energy ...

A flat plate solar collector as well as a thermal energy storage system was used in the process. Antipova E [8] addressed the optimal design of a solar desalination plant that integrated solar collectors, thermal energy storage, a Rankine cycle and reverse osmosis (RO) processes. ... The hollow fiber membrane module for air humidification is a ...

The phase change energy storage materials with three different support layers were successfully prepared and various properties were systematically characterized. There ...

novel, self-sustained hollow fiber membrane reactor running at <450 . o. C. The technology, if successful, is expected to solve H. 2. transportation and storage problems by using NH. 3 . as an effective H. 2. carrier for PEM fuel cell application, and may open potential markets utilizing H. 2 . as a fuel. NH. 3. High purity H. 2. N. 2 ...

Energy and economic analysis of a hollow fiber membrane-based desalination system driven by solar energy Desalination, 404 (2017), pp. 200 - 214, 10.1016/j sal.2016.11.002 View PDF View article View in Scopus Google Scholar

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A flat plate solar collector as well as a thermal energy storage system was used in the process. ... The hollow fiber membrane module for air humidification is a very important unit in the whole MHDD system. It is like a cross-flow shell-and-tube heat mass exchanger. The fiber-to-fiber modeling is not likely considering that there are numerous ...

This method overcomes the growth defect of ZIF-8 particles on the surface of the hollow fiber membrane. The compact and ultra-thin ZIF-8 layer was obtained by adjusting the growth parameters. Then, the obtained ZIF-8@PAN hollow fiber membranes were evaluated for H 2 /N 2 gas separation under different operating conditions. Furthermore, this ...

Plasma-based technologies providing extremely flexible "turnkey" applications are increasingly attracting interest in renewable energy usage and CO 2 conversion into carbon neutral fuels. Here, we report a breakthrough concept combining plasma and mixed ionic-electronic conductor hollow fiber membranes for significantly enhancing the oxygen ...

Energy need is predicted to increase by 48% in the next 30 years. Global warming resulting from the continuously increasing atmospheric CO2 concentration is becoming a serious and pressing issue that needs to be ...

The team will design membrane reactors for high-temperature WGS reaction by integrating hydrogen-selective membranes, catalysts, and optimized process designs; prepare and optimize CMS hollow fiber membrane modules to achieve high hydrogen permeance and hydrogen/CO 2 selectivity; design and prepare nano-catalysts with high WGS activity and ...

Hollow carbon fiber supported MoS 2 nanosheets composite for reliable sulfur electrochemistry. ... LSBs are considered as potential candidates for the next-generation ...

In this paper, a series of novel flexible phase-change smart lines were fabricated by double encapsulating paraffin into polypropylene hollow fiber membranes (PPHFMs) and ...

Based on the accidental discovery, a linear-phase change energy storage material (PCESM) could be designed by encapsulating phase change materials with hollow fiber membranes (HFMs). Using HFM as a carrier for ...

In this study, a novel system which integrates solar thermal energy with membrane gas absorption technology is proposed to capture CO2 from a 580 MWe pulverized coal power plant. Technical feasibility and economic ...

The membrane gas separation process has gained significant attention using the computational fluid dynamics (CFD) technique. This study considered the CFD method to find gas concentration profiles in a hollow fiber ...

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