Solar power dehumidification system

Should solar humidification-dehumidification desalination be hybridized?
Solar humidification-dehumidification desalination requires more research focus. Hybridizing desalination with other modules greatly enhances efficiency. Optimization and economic studies are recommended for these systems. Shortage of potable water resources is becoming a major and concerning threat to sustainable development.

How does a dehumidification module work?
Also,in the dehumidification module,they used Pinch technologyto predict the temperature of water leaving the heat exchanger. These data were in turn used to determine the optimum mass flowrate ratio of water to dry air as a design characteristic.

Does bubble column dehumidifier module performance affect a solar HDD unit efficiency?
The dehumidifier module performance of an HDH system affects the overall unit efficiency significantly. Therefore,the bubble column dehumidifier of a solar HDD plant was optimized using MATLAB simulation. Circulating air mass flowrate as well as the humidifier inlet water temperature were investigated as the operational conditions among others.

Can a thermoelectric module be used for air dehumidification?
Thermoelectric module is coupled with PVfor the air dehumidification section. A model was developed for predicting the performance and validated by experiment. In addition,an optimization algorithm was presented. A hybrid application with solar evacuated water heater,jut geotextile and solar still was analyzed.

What is humidification-dehumidification desalination (HDD) technique?
Humidification-dehumidification desalination (HDD) technique is among the developed desalination methods. It has some advantages regarding construction,maintenance,and operation. In this method,the saline water is heated,directly or indirectly,turning into water vapor and humidifying the ambient air.

Can air humidification technique be used to design a solar desalination plant?
During a numerical and experimental analysis in Cairo in 2009 , air humidification technique is employed as a developed effective method for design and manufacture of a solar desalination plant. For investigation purposes, three configurations were analyzed.

Recently, to solve the water scarcity crisis, challenges have arisen in exploring solar desalination systems with low power consumption. Along with that, a small-scale hybrid humidification-dehumidification /reverse osmosis desalination unit powered by concentrated photovoltaic/thermal solar technology is theoretically optimized and investigated.

In this paper, a desiccant coated heat exchanger (DCHE) system driven by solar energy is built and tested

under winter condition. The purpose of this experimental research is ...

Sorbent-based air cooling powered by solar energy is suggested. The solar power is used for heater of 1.5 KW power. It is investigated how solar energy is used to generate power and the effects of airflow rate and increases moisture removal rate (double sorbent wheel). The study"s anticipated findings will point to energy savings.

A state-of-the-art review is presented of the different technologies that are available to deliver refrigeration from solar energy. The review covers solar electric, solar thermal and some new emerging technologies. The solar thermal systems include thermo-mechanical, absorption, adsorption and desiccant solutions.

Optimization of liquid desiccant systems for solar/geothermal dehumidification and cooling. Energy, 5 (6) (1981), pp. 401-408. Crossref View in Scopus Google Scholar [55] ... Vapour-compression and liquid-desiccant hybrid solar space conditioning system for energy conservation. Renew Energy, 6 (7) (1995), pp. 719-723. View PDF View article View ...

The solar power meter is a suitable device to measure the horizontal solar intensity ... Energy and economic performance analysis of an open cycle solar desiccant dehumidification air-conditioning system for application in Hong Kong. Sol Energy, 84 (2010), pp. 2085-2095. View PDF View article View in Scopus Google Scholar

A PV-driven multifunctional dehumidification/hydrogen production system was developed, and proved that it has good all-day operation stability. With the increase of ...

It is investigated how solar energy is used to generate power and the effects of airflow rate and increases moisture removal rate (double sorbent wheel). The study"s ...

Sohani et al. [8] built a sun tracking solar still system to produce potable water. The potable water cost dropped from 0.0228 to 0.0225 $/L when side mirrors were added to the system. Elminshawy et al. [9] examined a humidification-dehumidification (HDH) desalination cycle driven by solar-geothermal heat. The experimental measurements showed that the daily ...

The energy cascade utilization (ECU) can effectively improve the performance of energy conversion systems. Based the ECU, the solar energy conversion systems are commonly used for refrigeration [10], heating [11], power generation [12] and dehumidification.

This work explores the advancement and potential of solar-powered humidification-dehumidification (HDH) desalination systems, addressing the critical challenge ...

This comprehensive review lays the groundwork for future research concentrating on humidification-dehumidification based energy cycles. Previous article in issue; Next article in issue;

Keywords. ... the chief reason for coupling the HDH systems with solar stills was an enhancement in productivity and therefore in the performance of the hybrid ...

However, this contradicts the local energy system. Therefore, a novel solar-driven liquid desiccant air conditioning system is described and investigated in this study. It combines photovoltaic and thermal solar power, dehumidification, and active cooling.

Solar desalination is gradually emerging as a successful renewable energy source of producing fresh water. This paper presents the solar humidificationâEUR" dehumidification technique to produce pure water from brackish water. Units ...

In this review paper, solar humidification-dehumidification desalination is investigated and studied throughout the literature. Accordingly, all considerable research ...

Solar energy is an innovative technology that is used to meet the growing energy requirements of the world. Hence, choosing a dehumidifier that operates on solar power is a massive benefit since it can also help you save bills. ... The user can use the collector for dehumidification and humidification according to the moisture content ...

Two solar energy systems are supplying the humidification-dehumidification system with heat and electricity, namely an evacuated tube solar collector and an array of photovoltaic panels, respectively. The studied system utilizes three fogging nozzles, each with a 10-µm diameter, that allow efficient energy conversion. ...

EXPERIMENTAL STUDY ON SOLAR DRIVEN DEHUMIDIFICATION SYSTEM WITH SILICA GEL COATED HEAT EXCHANGER IN WINTER Yao Zhao, Yanjun Dai, Jingyu Zhang ... et al. [8] successfully introduced solar energy to drive DCHE system and used two paratactic D CHE unit s to provide continuous dehumidification capacity. Later, Zhao et al. [9] ...

Professor Lizhi Zhang of South China University of Technology [21] has proposed a solar-driven hollow fibre membrane dehumidification (SHFMD) system this SHFMD system, solar is the primary energy resource, and fans and pumps would consume a ...

In the years of the great surge in solar energy R& D following the energy crisis of the 1970s there have been several attempts at building solar-driven cooling systems by means of a solar heat engine driving the compressor of a vapor-compression refrigeration system (Sargent and Teagan, 1973, Barber and Prigmore, 1974, Graf, 1978). These efforts ...

HDH is a simple technology that can be powered by a low-grade source of energy or by solar energy. In HDH, seawa-ter is desalinated by carrying of water vapor using air in a ...

Increasing freshwater demands globally has driven the development and performance enhancements through

various desalination technologies.Solar energy or waste energy for powering thermal desalination is one of the efficient energy management methods to alleviate water shortage. This article presents a comprehensive review of the recent advances ...

This paper examines the possibility of using a dehumidification system run by solar thermal energy for two specific purposes; (i) to pre-treat feed air stream for the air-conditioning unit and reduce latent heat and consequently electrical power consumption. ... For innovative technologies, renewable energy powered VCC systems, solar chimney ...

According to Mohamed et al. [21], Humidification and dehumidification systems have improved with air heating, ... However, the systems are utilizing the solar energy. Some of the major players in the market of desalination are: Desolenator, ACWA Power, Aquatech, AquaSwiss, and Sidem Veolia. Desolenator is using both thermal and electrical ...

Humidification is realized in a non-direct contact manner. The problem of salt water droplets crossover is overcome. Further, solar energy is used to drive the system. It is thus called as the solar energy powered and membrane-based air humidification-dehumidification desalination (MHDD) system.