Solar energy regeneration dehumidification

Overview

In a global era, continuous increment in energy requisition with its associated cost and relevant climate problems is causing accentuation in exploring more efficient ways to provide air conditioning in enclosed sp. Increased population, improved economy, comparatively lower cost of air conditioning. As early in history of solar operated LD air conditioning, Lof reported the use of LD TEG in dehumidification followed by evaporative cooling system as shown in Fig. 3. An auxiliar. In last few decades, a Hybrid solar system concept is getting more popular and popular due to its ability to achieve more required condition of air rather than LDAC alone. In the hybr. In the present paper, authors have attempted to include a detailed literature survey on regeneration of LD with the help of solar energy. Authors have also discussed the co. 1.Kodama A. An energy flow analysis of a solar desiccant cooling equipped with a honeycomb adsorber. Springer Science+Business Media Inc. Manufactured in.

Article Content

Experimental Study on Solar Driven Dehumidification System ...

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 to explore the ...

(PDF) Experimental Investigation of Solar-Driven Hollow

The dehumidification, regeneration, and cooling performance of the system between 8:30 and 17:30 are analyzed. The energy utilization of the solar collector and system is investigated. The results ...

Desiccant cooling with solar energy

Applied Thermal Engineering, 2008. This paper presents the numerical simulation results of an open cycle liquid desiccant dehumidification system, attempts to obtain the best configurations of the solar assisted airconditioning system and to validate the feasibility of using a liquid desiccant dehumidification system to handle the latent load and improve the energy efficiency of HVAC ...

Solid desiccant dehumidification and regeneration methods—A ...

Solar energy: Techajunta et al. 1999: Air dehumidification and air-conditioning in a tropical humid climate using solar energy- experimental investigation: Experimental: Silica gel: Single stage: Solar energy: Zhuo et al. 2006: Desiccant air conditioning using solar energy- experimental investigation and system design: Experimental ...

Performance Study of a Novel Solar Solid ...

In this paper, a novel solar solid dehumidification/regeneration bed was proposed where three regeneration methods, i.e., simulated solar radiation, microwave irradiation, and ...

(PDF) Solar Energy as a Regeneration Heat Source in Hybrid ...

Solar energy can be used as a source for regeneration heat provided in reactivating desiccant dehumidifier used in alternate cooling systems. Solid desiccant dehumidification system coupled with vapor compression-based hybrid air-conditioning systems can successfully assisted by renewable solar thermal energy to dampen electricity use and to ...

Performance Investigation of the Novel Solar-Powered Dehumidification ...

Energies 2017, 10, 1369 4 of 17 3. Construction of the Testing Rig In order to investigate the dehumidification and regeneration performance of the SPDW, the SPDW was designed with a total flat ...

Direct solar regenerated desiccant dehumidification system for ...

The solar-regenerated desiccant dehumidification rotating belt (SR-DDRB) utilizes directly the available solar radiation for regeneration, eliminating the need for external heating ...

A technical review on regeneration of liquid desiccant using solar energy

This paper provides an extensive literature review on development of liquid desiccant regeneration using solar energy. The paper also includes the recent findings of hybrid solar system in which either two sources of heat is used for regeneration of liquid desiccant or solar energy is used for regeneration of liquid desiccant along with other ...

Development and experimental validation of two novel solar d

Downloadable (with restrictions)! Two different solar desiccant-dehumidification-regeneration systems have been studied. Both have the same glazed area and utilize similar mechanisms for dehumidification and regeneration. The solid desiccant used is silica gel and the particle sizes fall in the ranges of 6–8 and 2–4 mesh. The structures of the systems are simple and they are ...

Experimental study of dehumidification performance and solar ...

Moreover, considering the advantage of low-grade thermal energy utilization, solar thermal energy can be used to further enhance the regeneration of DCHE to improve dehumidification performance and energy efficiency. In this paper, the solar-enhanced fresh air dehumidification system using DCHE driven by heat pump was proposed and a series of ...

A critical review on application of solar energy as renewable ...

Use of renewable solar energy can be a good source for regeneration heat provided in reactivating desiccant dehumidifier used in alternate cooling systems. Desiccant ...

(PDF) Experimentally validated model for atmospheric water ...

The role of solar energy contribution for both electrical and thermal applications is projected. It is anticipated that electrical outcome will supply electrical energy to a small air-conditioning unit if required (900 Watts), mini refrigerator (90 Watts), computer and printer (230 Watts) and 5 Compact Fluorescent integral ballast lamps (total ...

DESICCANT DEHUMIDIFICATION AND SOLAR THERMAL REGENERATION ...

Key Words: Dehumidification, Desiccant, Silica Gel Dehumidifier, Solar Energy, Regeneration. INTRODUCTION The rising demand of air conditioning involves huge consumption of fossil fuel in return causing climatic change & enhancing air-conditioning needs all over the world. 30% to 40% of overall electrical energy produced is consumed by ...

Development and experimental validation of two novel solar ...

The only energy used is from ventilating fans and solar energy input for system regeneration. There is a large potential for dehumidification in Taiwan. Previous ... Solar desiccant-dehumidification-regeneration systems 753 space to implement low humidity storage of instrument and electronic device or dehydration of agricul- ture products. ...

Development and modelling of a solar assisted liquid desiccant ...

This paper presents the development and simulation of an advanced solar assisted liquid desiccant dehumidification air-conditioning system for energy efficiency and ...

A critical review on application of solar energy as renewable ...

Use of renewable solar energy can be a good source for regeneration heat provided in reactivating desiccant dehumidifier used in alternate cooling systems. Desiccant dehumidification assisted vapor-compression based hybrid air-conditioning systems can successfully couple to renewable solar thermal power to dampen electricity use and to ...

Experiments in a solar simulator on solid desiccant regeneration ...

Saito studied a solar desiccant system using direct solar energy as a heat source for the efficient regeneration of the adsorbent. He investigated the regeneration in an integrated desiccant/collector (IDC) by experiments and mathematical simulations. Throughout his study silica gel was used as the adsorbent.

Study of an aqueous lithium chloride desiccant system: Air ...

Solar energy integrated with the desiccant dehumidifier can raise the temperature of desiccant more than 60°C and it saves around 35% of the energy during the peak summer season (Abdel-Salam, Ge ...

Optimization and evaluation of a solar energy, heat pump ...

that the energy consumed to regenerate DW due to a high regeneration air temperature requirement to remove the adsorbed water. When solar energy is applied to heating the regeneration air of DW, DW dehumidification systems may have good performance in both energy saving and indoor environment controlling.

(PDF) Solar Energy as a Regeneration Heat Source in Hybrid ...

Solar energy can be used as a source for regeneration heat provided in reactivating desiccant dehumidifier used in alternate cooling systems. ... worth of solar energy as renewable regeneration ...

Performance Investigation of the Novel Solar-Powered ...

To investigate the dehumidification and regeneration performance of the SPDW, the transient moisture removal, dehumidification efficiency, temperature difference between the building inlet and outlet air, heat transfer characteristics, ...

Optimal design of a novel combined heat source system using solar ...

On the one hand, solar energy as a regeneration heat source has good energy-saving and regenerative effects, making the construction of solar combined heat sources a promising avenue for application and development. Wasif et al. combined flat-plate solar air collectors with dehumidifiers to create a hybrid solar dehumidification system ...

Performance Study of a Novel Solar Solid Dehumidification/Regeneration ...

Independent temperature-and-humidity-controlled air conditioning systems are being more and more widely used in buildings. The complete air-conditioning cycle of the systems consists of the adsorption process, regeneration process and cooling process, while the regeneration process is the core of the entire cycle.

Liquid Desiccant Dehumidification Using Solar Regenerated ...

The solar-assisted regeneration of dehumidification used for air-conditioning was done to observe and analyze the visibility of solar energy to regenerate diluted desiccant and ...

Study of an aqueous lithium chloride desiccant system: air ...

A packed column air-liquid contactor has been studied in application to air dehumidification and regeneration in solar air conditioning with liquid desiccants. ... Experimental study of the heat and mass transfer in a packed bed liquid desiccant air dehumidifier. J. Solar Energy Eng. Trans. ASME 120, 289–297. ¨ Oberg V. and Goswami D. Y ...

Liquid Desiccant Dehumidification Using Solar Regenerated System ...

The solar-assisted regeneration of dehumidification used for air-conditioning was done to observe and analyze the visibility of solar energy to regenerate diluted desiccant and to work continuously for comfort in the house. The experiment was done in the month of May after running the experiment for two hours from 12:00 a.m. to 2:00 p.m. and ...

Direct solar regenerated desiccant dehumidification system for ...

The solar-regenerated desiccant dehumidification rotating belt (SR-DDRB) utilizes directly the available solar radiation for regeneration, eliminating the need for external heating sources. Although the system ensures a decrease in process air humidity, single-stage SR-DDRB might have limited dehumidification capacity especially in high humid conditions and low solar ...

A comprehensive review on solid desiccant-assisted novel ...

This can recovered the useful heat of process air section of dehumidifier to regeneration air section of dehumidifier by increasing overall cycle efficiency. ... improvement of desiccant air conditioner coupled with humidification-dehumidification desalination unit using solar reheating of regeneration air. Energy Convers Manag. 2019;198:111–808.

Solid Desiccant Dehumidification and Regeneration Techniques

Applied Thermal Engineering, 2008. This paper presents the numerical simulation results of an open cycle liquid desiccant dehumidification system, attempts to obtain the best configurations of the solar assisted airconditioning system and to validate the feasibility of using a liquid desiccant dehumidification system to handle the latent load and improve the energy efficiency of HVAC ...

A Liquid Desiccant System for Solar Cooling and Dehumidification

Contributed by the Solar Energy Division of THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS for publication in the ASME JOURNAL OF SOLAR ENERGY ENGINEERING. Manuscript received by the ASME Solar Energy Division May 2003; final revision, December 2003. ... Two-Stage Liquid Desiccant Dehumidification/Regeneration. ...

A Liquid Desiccant System for Solar Cooling and Dehumidification

This study investigates the dehumidification and energy performance of central ventilation systems based on a liquid desiccant-assisted dedicated outdoor air system applied to an apartment ...

A liquid desiccant system for solar cooling and dehumidification

Earlier work has been conducted on liquid desiccant systems for cooling and dehumidification, using solar energy for regeneration. In several cases, direct regeneration of the solution in the sun has been considered, using a special type of collector. ... The useful dehumidification energy is the product of the change in humidity ratio of the ...

DESICCANT DEHUMIDIFICATION AND SOLAR THERMAL ...

Thermodynamic and chemical properties of desiccant material has been analysed with focus on regeneration of desiccant using solar energy. Key Words: Dehumidification, Desiccant, Silica ...

Performance Investigation of the Novel Solar-Powered ...

In this paper, a solar-powered dehumidification window (SPDW), combining a conventional double-glazed building window with a solid desiccant packed bed and a photovoltaic panel, has been proposed to dehumidify the air supplied to ...

Experimental Investigation of Solar-Driven Hollow Fiber ...

A solar-driven hollow fiber membrane dehumidification experimental rig was designed to investigate its performance from July to September in Guilin, China. The dehumidification, regeneration, and cooling performance of the system between 8:30 and 17:30 are analyzed. The energy utilization of the solar collector and system is investigated.

(PDF) Reactivating desiccant dehumidifiers

Solid desiccant dehumidification system coupled with vapor compression-based hybrid air-conditioning systems can successfully assisted by renewable solar thermal energy to ...

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