Solar wheel dehumidification system

In the present work, experiments have been performed to examine the cooling and dehumidification process in the summer season for human comfort and industrial application with the help of calcium chloride (CaCl2) based desiccant material solid desiccant wheel integrated with solar heating arrangements. In this study experimental findings are also ...

Desiccant wheel (DW) dehumidification system could adsorb water vapor of air without cooling. The main problem is 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 ...

Low dew-point desiccant wheel systems are summarized and discussed in detail. Single-stage and two-stage low dew-point desiccant wheel systems are examined. Cold and heat sources are key factors affecting energy efficiency. Optimization measures to ...

Li et al. investigated biomass gasification-based cogeneration systems integrated with desiccant-coated heat exchanger dehumidification, covering the cogeneration system inclusive of sensible heat storage and internal heat recovery (SC-1), the cogeneration system inclusive of sensible heat storage (SC-2), and the cogeneration system exclusive of ...

Most of the required energy for the regeneration process of dehumidification wheel can be met by thermal gain of the solar hybrid PVT array during the day. The outlet processed air (dehumidified air stream) incurs a smaller latent load on a proposed small-scale air-conditioning system which can help to bring the humidity level inside the cabin within human ...

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It is investigated how solar energy is used to generate power and the effects of airflow rate and ...

A typical solar dehumidification air conditioning system uses a desiccant wheel to dehumidify the fresh air, then uses an evaporative cooler to cool the dehumidified air, and finally uses a solar collector to regenerate the desiccant wheel to ensure that the cooling and dehumidification process can operate continuously. The heat for ...

A typical solar dehumidification air conditioning system uses a desiccant ...

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the summer season for human comfort and industrial application with the help of calcium chloride (CaCl 2) based desiccant material solid desiccant wheel integrated with solar heating arrangements.

Low dew-point desiccant wheel systems are summarized and discussed in detail. Single-stage and two-stage low dew-point desiccant wheel systems are examined. Cold and heat sources are key factors affecting energy efficiency. Optimization measures to improve dehumidification capacity are summarized.

Solar thermal-powered desiccant dehumidification systems are attracting attention for cooling load-dominated climates. However, their performance varies substantially from place to place depending on climatic conditions, which therefore warrants a tailored design and specification at each geographical location.

In this paper, a comparative analysis of the operation of three different models of solar cooling using desiccant wheel with solid material filling was performed. The simulation of the analyzed models was conducted in TRNSYS for conditions describing the humid air parameters of the existing system in operating mode.

In this paper, the basic principles and recent research developments related to rotary desiccant-based cooling systems are recalled and their applications and importance are summarized.

Through an experimental study conducted, performance evaluation of a parabolic trough solar collector assisted rotary desiccant dehumidification system has been performed based on the parameters including air flow rate, regeneration air temperature, inlet-outlet air temperature, and humidity ratios. Findings indicated that the ...

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. To determine the eliminated moisture as a function of air flow rate at solar noon, an empirical equation is utilized ...

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