

電気流体力学 (EHD) 効果を利用する 蓄熱式太陽乾燥システムの研究

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Study on Heat Storage Type Solar Drying System Utilizing Electro-hydro-dynamical Effect

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Abstract

In this paper, a system of the EHD solar heat collector utilizing the outdoor source of electricity with the solar cells is proposed for improvement of solar collector efficiency. The EHD solar collector is cylindrical and a double structure made of glass. Between the outer cylinder and the inner cylinder, there are black round stones for thermal storage. R123 as a heat transporting medium is supplied in the inner cylinder. It is experimentally clarified that the temperature of the heat storage in case of applying voltage between electrodes of the EHD solar collector is higher than that of not applying voltage. Namely, the effect of corona wind is recognized.

The solar drier which associated an air-type solar collector and a drying room is manufactured as an experiment, and that solar collection properties is discussed. The solar collector was irradiated from the top downward by the sunlamp in the room. As degrees of an angle of inclination increased, temperature-rise grew bigger, and the range of wind velocity of drier outlet was from 0.15 to 0.20 m/s. These results shows that natural convection appears in the solar collector, and heated warm air is flowing to the drying room.

Improvements are made on amino acid analysis method in accuracy and efficiency. Adopt the post column method in place of the pre column method in the strategy of amino acid analysis. The amino acid is derivatized with new chemistry as 6-aminoquinolyl-N-hydroxysuccinimidyl carbamate (AQC). It became the quick and accuracy analysis will be possible by this method.

Key words: EHD Solar collector, solar drier, amino acid analysis method

1. ま え が き

木材の乾燥をはじめ、鮮魚、海藻、キノコ、穀類等の各種農水産物の乾燥に温風乾燥法が広く用いられている。温風乾燥法はLPG、灯油などの化石燃料を燃焼した排ガスと外気とを熱交換することにより、温風を作り出し、乾燥室に導

いている。しかし、燃焼にともない発生するNO_xによる環境汚染、CO₂による地球温暖化などを考えると、自然エネルギーの一つである太陽エネルギーを利用した太陽乾燥システムの開発が必要である。

太陽熱利用システムの構成にとって重要なことは、集熱、蓄熱、熱輸送および利用の全体をシステムとしてとらえ、その高効率化である。そこで、集熱器の効率向上を図って、電気流体力学 (EHD) 効果を利用する高効率太陽集熱器の開発を進めてきた^{1,2)}。現在、集熱器は平板型

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