ANALYSIS, DESIGN, AND PRELIMINARY TESTING OF SOLAR CHIMNEY FOR RESIDENTIAL AIR-CONDITIONING APPLICATIONS

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ABSTRACT

A solar chimney is designed and tested to pump outside air through an underground cooling tube during summer for building cooling. Both theoretical analysis and experimental results show that the solar chimney can be used to power the underground cooling system during daytime without use of electricity. This paper presents the theoretical design principals of the solar chimney, detailed experimental facilities, and the experiments results. The impacts of other related parameters, such as building tightness and tube design on the system airflow are also discussed in the paper.