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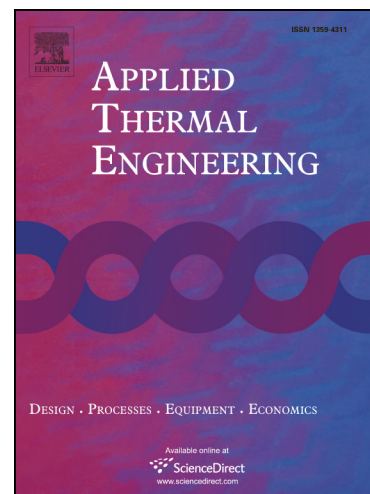
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Application of a multi-function solar-heat pump system in residential buildings

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Highlights

- (1) Solar PV/T collector based on micro heat pipe array was employed, of which performance was improved.
- (2) Multi-function heat pump system was designed to realize the utilization of renewable energy.
- (3) Solar PV/T collector was combined with the multi-function heat pump system to form the new system.
- (4) The residential demand could be afforded by operating in different modes to realize maximum possible energy conservation.

Abstract: In this study, a multi-function solar photovoltaic/thermal (PV/T)-heat pump system was designed and established to supply energy for residential buildings. The system could realize different functions by operating in different modes, such as heating in winter, cooling in summer, domestic water heating for a whole year, and part of household electricity demand. System performance was experimentally investigated. Results showed that the average overall efficiency of PV/T collector was more than 50% for PV/T water heating mode when solar irradiance was sufficient,

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