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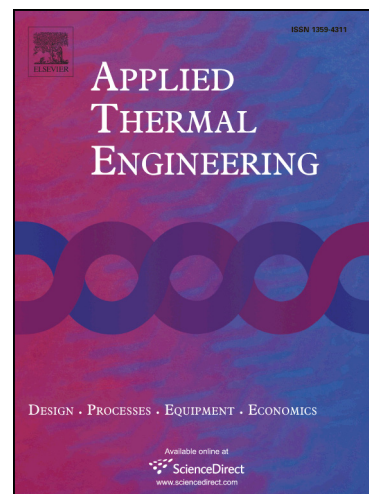
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# Experimental study on a new type of thermal storage defrosting system for frost-free household refrigerators

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## Abstract

Among household refrigerators, air cooled frost-free household refrigerators have become popular in the market because of the advantages of large storage volume and frost-free compartment(s). However, the large power consumed by the process of defrosting the evaporator restricts the widespread application of such refrigerators. In this study, a new type of thermal storage defrosting system combined with bypass cycle is presented, the feasibility of the thermal storage defrosting system is analyzed, four kinds of different PCMs are tested, the operation modes of the overall system are proposed, and the structure of the heat storage exchangers is designed and optimized. Next, the experimental prototype is set up, and the experimental study is carried out for different defrosting modes. The results show that the best defrosting mode enhances the defrosting speed by about 50% more than the original electric heating model as well as reduces defrosting electric power consumption by about 71%.

**Keywords:** *Defrosting, Thermal storage, Phase change material, Frost-free, Household refrigerator, Bypass, Paraffin*

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