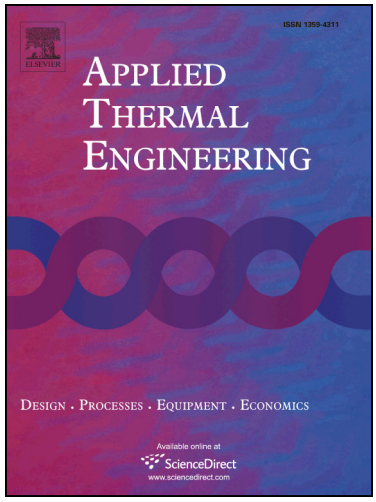

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Comparative study on the energy performance of two different absorption-compression refrigeration cycles driven by low-grade heat

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Abstract

In this paper, performances of an absorption-compression refrigeration cycle with an evaporator-condenser (EC) and a novel absorption-compression cycle with an evaporator-subcooler (ES) are carefully compared and analyzed, which both have energy-saving potential. The comparison is based on three energy performance parameters----the COP of compression subsystem, low-grade heat transforming ratio, and global COP taking into account power cycle efficiency. Comparative investigation is carried out over evaporating temperature (T_e) ranging from -20 to 10 ºC, generating temperature (T_g) ranging from 90 to 120 ºC, and condensing temperature (T_c) ranging from 35 to 45 ºC. Based on the analysis of COP of compression subsystem, EC should be adopted when low-grade heat is free and absorption system cost is low. According to the analysis of low-grade heat transforming ratio, ES is recommended when low-grade heat cost much. Based on the analysis of global COP, EC saves more energy at low T_e and high T_g, where the global COP of EC is 7.6% and 14.6% higher than that of ES, respectively. However, ES has a good performance at high T_e and low T_g, where the global COP of EC is 18.6% and 8.8% higher, respectively. The better cycle is recommended for different working conditions.

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