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# Experimental study for a high efficiency cascade heat pump water heater system using a new near-zeotropic refrigerant mixture

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## ABSTRACT

Single-stage water-source heat pumps have some disadvantages such as high pressure ratio and lower coefficient of performance at high water outlet temperature, and normally the temperature promotion cannot exceed 50°C. To surmount these disadvantages, a high temperature water-source cascade heat pump (HTWSCHP) was suggested; the HTWSCHP system demonstrates a much more competitive performance at high water outlet temperature of 142°C and the temperature promotion can reach 90°C. Lots of researches have been performed to analyze the cascade heat pump system, but they are normally about the low ambient temperature and there is very little information about the high water-outlet temperature. In this study, a HTWSCHP system was investigated experimentally. The high and low refrigerant cycle employed BY-3(A&B) and R245fa respectively. The experimental test

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