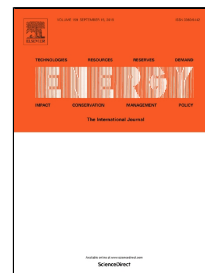


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Low-grade waste heat driven desalination with an open loop heat pipe

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ABSTRACT

An innovative low-grade heat driven desalination system inspired by heat pipe is proposed in this work. The system utilizes siphon force to create vacuum environment for seawater evaporation at much lower temperature which can significantly reduce energy consumption. The capillary force of the NiO wick pumps the seawater to the evaporator and pushes the generated vapor to the condenser without using any additional mechanical equipment. Localized vaporization in the micro channels of the NiO wick's surface further improves the heat utilization efficiency. Experimental results show that nearly 3.88 kg/(m²·h) of distilled water production rate can be produced at the heat source temperature as low as 34 °C and this value can be increased to 55.25 kg/(m²·h) at the temperature of 60 °C. The corresponding heat-conversion efficiency is 65.2% and 90.7%, respectively, which is much higher than that of most conventional desalination techniques. With the very low temperature operation condition

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