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عنوان مقاله:

Heat transfer and fluid flow analysis of a novel micro-miniature cryocooler model

محل انتشار:

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خلاصه مقاله:

In the current study, a new model for micro-scale cooling systems is presented. The small-scale refrigerator is modeled by engraving channels and a micro nozzle on the sides of a rectangular glass. The system has the capability to reduce the temperature from 300K to 80 in 5 seconds using nitrogen as the working fluid. The model consists of three elements, heat exchanger, nozzle and expansion tank and all the parts of the cooling system is stationary. For this novel model, pressure drop through the channels and nozzle sections is presented and by using these information, temperature drop through the nozzle is obtained regarding the high Mach number at the throat of the convergence-divergence micro-nozzle. Due to the characteristics of this in-plane micro-nozzle, the heat exchange is modeled through the time in the glass, and temperature of the cooling system is reported.

کلمات کلیدی:

Micro-miniature cooler, Joule Thomson cooler, heat transfer characterization, performance analysis, micro cooler

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