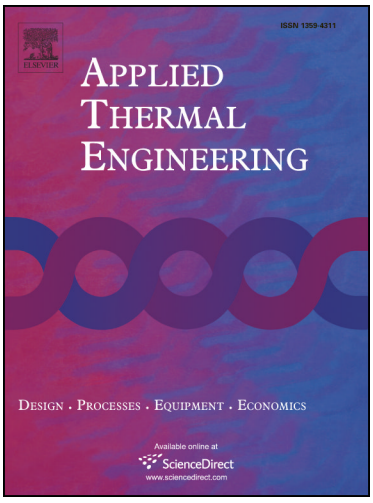

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Characteristics of the laminar convective heat transfer of molten salt in concentric tube

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Abstract

In this paper, laminar convective heat transfer performance of molten salt with Reynolds number of 300-2300 and Grashof number of 8.56×10^4-3.95×10^6 in a concentric tube heat exchanger is reported. The effects of temperature on the heat transfer coefficient of molten salt are experimentally studied with the temperature of 473 K-573 K. Results show that the measured Nusselt number is larger than that predicted by pure forced convective heat transfer correlations and the deviations decrease as Reynolds number increases. In addition, the experimental result displays a completely different dependence on the temperature from forced convective correlations. It is presumably that the radial density gradient gives rise to buoyancy motion resulting in the formation of natural convection and then strengthen the heat transfer performance in laminar region. By comparison, it is found that the experimental result follows the trend of laminar convective heat transfer correlations derived from traditional working medium, however, the traditional correlations cannot describe the molten salt adequately. Therefore, based on the experimental