

Heat Transfer Characteristics of Aluminum Foam Heat Sinks Subject to an Impinging Jet

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Abstract : This study investigates the heat transfer characteristics of aluminum foam heat sink and pin fin heat sink subjected to an impinging air jet under a fixed pumping power condition as well as fixed flow rate condition. The effects of dimensionless pumping power or the Reynolds number and the impinging distance ratio on the Nusselt number are considered. The result shows that the effect of the impinging distance on the Nusselt number is negligible under a fixed pumping power condition, while the Nusselt number increases with decreasing the impinging distance under a fixed pumping power condition. A correlation for the pressure drop is obtained as a function of the flow rate and the impinging distance ratio. And correlations for the stagnation Nusselt number of the impinging jet are developed as a function of the pumping power. The aluminum foam heat sinks did not show higher thermal performance compared to a conventional pin fin heat sink under a fixed pumping power condition.

Keywords : aluminum foam, heat sinks, impinging jet, pumping power

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