

Recent Innovations in Micro Pulsating Heat Pipes for Heat Spreading

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This talk is intended to provide a perspective and review of recent advances in micro pulsating heat pipes (MPHPs), which can be used as an effective heat spreader for heat generating devices of various shapes. MPHPs consist of liquid-vapor slug-train units oscillating within a serpentine microchannel with a hydraulic diameter of less than 1 mm. MPHPs have a width and length of 35 mm and 80 mm, respectively. They have the following characteristics: an effective thermal conductivity of 9,000 W/m·K, 5,000 times higher than the base materials, and a thickness of 1.5 mm. Compared to conventional pulsating heat pipes, MPHPs have interesting features like orientation independent performance and a wide operating range even under the local heating condition. In addition, several new ideas for thermal performance enhancement in MPHPs will be presented. This talk will conclude with an overview of ongoing research activities associated with a prestigious 9-year grant by Korea's Creative Research Initiative to develop Flexible and Thin Thermal Superconductors.