

MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)  
Fluid and Materials Sciences (2)

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MICRO-CHANNEL FLOW BOILING HEAT TRANSFER AND ITS APPLICATIONS IN AEROSPACE  
THERMAL REGULATION SYSTEMS**Abstract**

Heat management in aerospace facilities is confronting rising challenges due to the extremely high heat dissipation capacity requirement in ever more miniaturized and intensified processes. Efforts have been made for heat transfer enhancement. However, the drastically increasing heat transfer requirements are still calling for extensive experimental investigations, especially on the phase change processes in micro-scale passages under micro-gravity conditions. A review of the experimental studies on two-phase flow boiling and heat transfer in small flow passages was presented. Studies conducted at micro-gravity conditions were particularly concentrated on. Some experimental results published in the past 20 years were overviewed, revealing some controversial conclusions on microscale flow boiling heat transfer mechanisms. Moreover, the use of nanofluids in heat transfer enhancement was highlighted. It should be admitted that the existing database is still limited, especially for flow boiling in passages with unique geometries under micro-gravity conditions. Extensive explorations on flow boiling heat transfer in micro-channels are essential for further applications in micro-systems in aerospace thermal regulation systems.