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Experiemnt investigation on heat transfer performance enhancement of PFC hypervapotron by micro surface manipulation technology

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With the progress of ITER and the planned fusion-fission hybrid reactor, there is an urgent need to develop high effective and practical heat-transferring technologies for the removal of extremely high heat fluxes of about 20 MW m-2. Hypervapotron, developed from a subcooled fin enhancement cooling concept, has received widely concerns. With the development of surface manipulation technology in recent years, the surface with micro/nano-structures was recognized as another pathway for boiling efficiency enhancement. This paper presents the efforts to enhance the subcooled boiling performance by a kind of micro surface manipulation technology, which produces 400×400μm pillars on boiling surfaces by combining photolithography with electroplating technology. Preliminary experiments present a significant increase in heat transfer performance as compared with plain test model, indicating a great potential to further enhancement of CHF.

Eligible for student paper award?

Yes

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