

Performance of Boiling Heat Transfer on Microporous Surface

추고연, 김민정, 김동국*
한국에너지기술연구원
(dokkim@kier.re.kr*)

Efforts to maximize the performance of boiling heat transfer have resulted in the development of many different surface enhancement techniques. The coating method is generally a surface treatment technique used to increase bubble entrapment volume and active nucleation site density by forming porous structures with natural cavities against the artificial cavities of finned surface. From the current research, the microporous coating method has been used to improve the boiling heat transfer coefficient of water and R-123 for industrial refrigeration or heat pump cycles. Test results of a coated surface(1cm²) pool boiling in saturated R-123 revealed significant heat transfer improvements over a plain surface for the entire boiling curve: (1) boiling incipience superheat was reduced 85%, (2) nucleate boiling heat transfer coefficient was increased by over 400%, and (3) critical heat flux(CHF) was increased by 60%. The excellent performance of the coating results from an increase in both the number of nucleation sites and bubble departure frequency per site.