Jirarote Buranarote 2006: Critical Heat Flux of Water in Micro Tube Flow. Master of Engineering (Mechanical Engineering), Major Field: Mechanical Engineering, Department of Mechanical Engineering. : Thesis Advisor: Associate Professor Varangrat Juntasaro, Ph.D. 84 pages.
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The main objective of designing the heat reduction system in the electronic device is to enhance the heat transfer between the fluid in the small tube and the system. The flow pattern in the small tube is different from that in the conventional tube resulting in the different heat flux. This work is to find the correlation between the critical heat flux (CHF) of water in the micro tube and the diameter of the tube using the computational fluid dynamics (CFD) technique. This is because the experiment to find the CHF of water in a micro tube is complicated due to the difficulty in the installing of the measuring equipment in a very small tube. The results of the correlation between the CHF of water in the micro tube and the diameter of the tube are displayed in the form of the correlation equation. The CHF of water in the transitional nano tube, the transitional micro tube, the mini tube and the small tube is inversely proportional to the diameter of the tube. However, the CHF of water in the micro tube is proportional to the diameter of the tube. This is because the velocity gradient in the micro tube is decreased with the decreasing diameter of the tube. This is contrary to the other sizes of the tube that the velocity gradient is increased with the decreasing diameter of the tube. The correlation equations developed in this work can be used to find the CHF in the tube with various diameters from the small tube to the transitional nano tube at different values of pressure and mass flux.

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