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Evaporation lifetime and boiling curve on hemispherical stainless steel (304) surface (Conference Paper) (Open Access)

Illias, S., Hussain, S., Rosman, N.A., Abdullah, N.S., Shaiful, A.I.M., Omar, M.N.B., Ismail, K.A., Ani, H.

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[a]School of Manufacturing Engineering, Universiti Malaysia Perlis, Pauh Putra Campus, Perlis, Arau, 02600, Malaysia
[b]Department of Manufacturing and Materials, Kulliyyah of Engineering, International Islamic University Malaysia, PO Box 10, Kuala Lumpur, 50728, Malaysia

View additional affiliations

Abstract

The purpose of this research is to study and investigate the evaporation lifetime and boiling curve on hemispherical heated surface. The selected material was stainless steel (304). A nearly perfect and smooth hemispherical surface was developed by using EDM die sinker. For the test liquid, distilled water was used during the experimental work. The average droplet temperature was 31.36 °C corresponding to liquid subcooling ΔT_{sub} = 68.64K. Based on the theoretical calculation, the diameter of the water droplet was approximately 5.00 mm. Meanwhile, the impact height was approximately 65.0 mm corresponding to the theoretical impact velocity of 1.129 m/s. The material was heated using a digital hot plate which was able to give an accurate reading and stable temperature fluctuation during the heating process. The temperature ranged from a low temperature of T_w = 100 °C to a high temperature of T_w = 300 °C. As a result, the boiling curve showed a similar pattern of other experimental work that consists of two (2) important points which are Critical Heat Flux(CHF) and Leidenfrost temperature. © Published under licence by IOP Publishing Ltd.

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