

Wettability in Condensation Phenomena

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Extended Abstract

Enhancement of heat transfer coefficients for condensation is an active area of research. The interaction of the condensate with the condensation surface or wettability of the surface is an important factor that controls the heat transfer process (Baojin et al., 2011). If the condensed fluid quickly coalesces, it forms a thin film and wets the entire surface, film wise condensation (FWC) is said to have taken place (Narhe et al., 2000) on the other hand, drop wise condensation (DWC) occurs in the form of liquid droplets on surfaces.

Although many studies have been devoted to the wetting behaviour of drops deposited on a surface (Lafuma et al., 2003), very few have delved into the condensation process. In this paper we show how condensation on substrates can induce wetting behavior that is quite different from that of deposited or impinging drops. We describe surfaces with the same wettability in ambient conditions presenting different wetting behavior and growth of droplets in condensation. The experimental results show a rapid spread of droplets and formation of the film on the copper surface, while droplets on SU-8 surface remains on the regular shape while they grow within the time, without coalescence, as observed for Cu. Although the heat conductivity of SU-8 is much lower, due to a difference in wetting behavior, the heat transfer coefficient (h) is higher for dropwise condensation on Cu with a thin layer of SU-8 than filmwise on the bare copper.

Keywords: Condensation, Wettability, Droplet, Heat transfer coefficient

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