

## **EFFECT OF SURFACE WETTABILITY ON FLOW BOILING IN A MICROCHANNEL**

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**ABSTRACT** Flow boiling in microchannels is a promising thermal management technique for several high heat flux applications. Confinement effects and surface tension play an important role in the two-phase flow behavior in mini and microchannels, where the surface properties strongly influence the hydrodynamics and heat transfer inside the passage. In the present study, the Volume of Fluid (VOF) model is used to assess the two-phase flow regimes in a heated microchannel with the coupling of a phase-change model. The effect of surface wettability of the channel walls on the cooling performance and two-phase flow will be assessed by varying the wall contact angle and coolant mass flux (water). The present model allows the transient analysis of the flow boiling mechanisms according to the operating conditions and the visualization of the main flow regimes and transition between them. Results indicate that hydrophobic surfaces provide higher heat transfer coefficients due to a more effective removal of the generated vapor inside the channel.