

Abstract Submitted  
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**Parametric study of cross shaped hydrophobic dot for pool boiling**<sup>1</sup> JUNG SHIN LEE, JOON SANG LEE, Yonsei Univ — In this work we applied the shape of hydrophobic dots as a new variable of pool boiling with patterned wettability. We investigated the effect of dot shapes on heat transfer rate and buoyancy of bubbles. The shape of dot is set to be cross-shaped with the aspect ratios of the branches were varied in four cases: 0.173, 0.444, 1.074, and 2.000. In this research, multiphase single component lattice Boltzmann model was used for the simulation. The shapes of contact lines were similar to the shape of boarder lines of hydrophobic dots, but the surface tension to make the contact line in circular shape also existed. For dots with larger aspect ratio, the shape of contact line was too distorted. Therefore large portion of the contact line invaded to the hydrophilic surface via surface tension. The fluid near contact line on the hydrophilic surface has shown large buoyancy force by capillary flow toward contact line. This overall large buoyancy force caused the quick departure of the bubble. Therefore, with large aspect ratio, the heat transfer dropping period was reduced, while heat transfer rate increased in total nucleation cycle.

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