World Academy of Science, Engineering and Technology
International Journal of Aerospace and Mechanical Engineering
Vol:17, No:05, 2023

Boiling Heat Transfer Enhancement Using Hydrophilic Millimeter Copper Free Particles

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Abstract : Modification of surface wettability is one of the conventional approaches to manipulate the boiling heat transfer. Instead of direct surface modification, in the present study, the surface is decorated with free copper particles with different hydrophobicity. We used millimeter-sized copper particles with two different hydrophobicity. The surface is covered with untreated, hydrophilic, and a combination of hydrophobic and hydrophilic copper particles separately, and the heat flux and wall superheat temperature was measured experimentally and compared with the bare polished copper surface. The results show that the untreated copper particles can slightly improve the boiling heat transfer when the hydrophilic copper particles have better performance. Combining hydrophilic and hydrophobic copper particles reduces boiling heat transfer.

Keywords : boiling heat transfer, copper balls, hydrophobic, hydrophilic
Conference Title : ICMEAFM 2023 : International Conference on Mechanical Engineering and Applied Fluid Mechanics
Conference Location : Sydney, Australia
Conference Dates : May 11-12, 2023