

Heat transfer enhancement of polished laser-textured copper surfaces in saturated pool boiling

By

Are you this author?

Sugumaran, L (Sugumaran, Luvindran) ^[1]; Zubir, MNM (Zubir, Mohd Nashrul Mohd) ^[1], ^[2], ^[3]; Newaz, KS (Newaz, Kazi Salim) ^[1], ^[4]; Zaharinie, T (Zaharinie, Tuan) ^[1], ^[4]; Aznam, SM (Aznam, Suazlan Mt) ^[6]; Halil, AM (Halil, Aiman Mohd) ^[7]; Abdullah, S (Abdullah, Shekh) ^[8]; Shaikh, K (Shaikh, Kaleemullah) ^[1], ^[9]; Ahmad, N (Ahmad, Norhafizan) ^[1], ^[5]

[View Web of Science ResearcherID and ORCID](#) (provided by Clarivate)

Source

CASE STUDIES IN THERMAL ENGINEERING

← [View Journal Impact](#)

Volume: 84

DOI: 10.1016/j.csite.2026.108254

Article Number

108254

Published

AUG 2026

Indexed

2026-06-27

Document Type

Article

Abstract

Optimizing pool boiling heat transfer is essential for the thermal management of high-power electronics and energy systems. This study investigates the enhancement of boiling performance on copper surfaces through a dual-step laser processing technique: initial micro-texturing followed by a precision laser-polishing refinement. The boiling characteristics were evaluated for three surfaces: bare copper (BS), unpolished laser-textured (L1D1-X), and laser-polished (L1D1). While initial laser texturing increased the density of nucleation sites, redeposited nanometal lumps at the micropillar edges on the L1D1-X surface created a locally hydrophobic state

Citation Network

In Web of Science Core Collection

0 Citations

[Create citation alert](#)

71

Cited References

→ [View Related Records](#)

How does this document's citation performance compare to peers?

← [Open comparison metrics panel](#)

Data is from InCites Benchmarking & Analytics

Use in Web of Science