Abstract Submitted
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Droplet Mobility and Heat Transfer during Condensation Phase-Change on Hierarchical Lubricant Infused Surfaces[1] DANIEL OREJON, University of Edinburgh, I2CNER - Kyushu University, YOTA MAEDA, Kyushu University, FENGYONG LV, Shanghai Institute of Technology, PENG ZHANG, Shanghai Jiao Tong University, YASUYUKI TAKATA, I2CNER - Kyushu University — Lubricant infused surfaces (LISs) have drawn increasing attention due to their excellent low-adhesion enabling the occurrence of condensation in a dropwise manner. In this work, we address the condensation performance on LISs paying special attention to the surface structure underneath the condensing water droplets and the oil. We make use of hierarchical micro-/nano-structured and solely nano-structured LISs fabricated as in Maeda *et al.*, *Appl. Therm. Eng.* **176** (2020). Important differences are here reported when comparing the condensation performance in the presence and absence of micro-structures. On one hand, the presence of micro-structures enhances mobility and droplet shedding performance shifting the droplet size distributions towards greater number of smaller-sized droplets. Whereas on the other hand, the additional thermal resistance exerted by the micro-structures and the oil is responsible for the deterioration of the theoretical heat transfer performance. We conclude that a fine balance between enhancing droplet mobility without penalizing heat transfer must be carefully achieved for the effective rational design of LISs with enhance heat transfer performance.

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Daniel Orejon
Univ of Edinburgh

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