Contribution ID: **450** Type: **Poster (+) Presentation**

Hindered thermally driven migration of a drop on a chemically patterned wall chemically patterned solid wall

Wednesday, 2 June 2021 16:00 (1 hour)

A freely suspended drop in a thermal gradient migrates to the hot side since surface tension is usually a decreasing function of temperature. If the drop is attached to a surface with a temperature gradient, the motion is more complicated. The drop either moves to the hot side or cold side, depending on the contact angle and the viscosity ratio. If the surface is patterned, the wettability, or the contact angle, is different for different patches and here we show, using numerical simulations of two-dimensional flows, that a drop can be brought to a stop at the boundary of two patches, even if the drop moves in the same direction on either patch. Two quantities are defined to judge whether the patterned surface can hinder the thermally driven migration of a droplet, namely, defect strength and minimum defect strength. The patterned surface can hinder the droplet migration only when the defect strength is larger than the minimum defect strength. The minimum defect strength increases with the Marangoni number but decreases with the viscosity ratio. Thus, migration of a droplet is easily hindered for low Marangoni numbers and low droplet viscosity, and these results are summarized in a phase diagram.

Time Block Preference

Time Block B (14:00-17:00 CET)

References

[1] Sui, Y. (2014). Moving towards the cold region or the hot region? Thermocapillary migration of a droplet attached on a horizontal substrate. Physics of Fluids, 26(9), 092102.

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