Abstract Submitted
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Marangoni spreading and contracting three-component droplets on completely wetting surfaces[1] NATE CIRA, DIETER BAUMGARTNER, SHAYANDEV SINHA, Rowland Institute at Harvard University, STEFAN KARPITSCHKA, Max-Planck Institute for Dynamics and Self-organization — Marangoni flows are a well-established mechanism for inducing droplet spreading and contraction. In this work, we study the behavior of a three-component mixture (ethanol, water, and propylene glycol) on high energy surfaces. Evaporation driven concentration differences give rise to surface tension gradients and Marangoni flows responsible for three categories of behavior across the ternary concentration space – contraction, enhanced spreading, and sequential spreading then contraction. Based on the combined effects of each component's evaporation on surface tension, we predict boundaries for each of these behaviors that align well with experimental data across a wide range of concentrations and humidities. We present additional data on how internal flow structures impact droplet shape. Self-expansion and contraction make these droplets suitable for cleaning high energy surfaces.

[1]Rowland Institute at Harvard University

Nate Cira
Rowland Institute at Harvard University

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