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**Tunable Superomniphobic Surfaces for Sorting Droplets by Surface Tension** SANLI MOVAFAGHI, WEI WANG, ARI METZGER, DESIREE WILLIAMS, JOHN WILLIAMS, ARUN KOTA, Colorado State University — Manipulation of liquid droplets on super-repellent surfaces (i.e., surfaces that are extremely repellent to liquids) has been widely studied because droplets exhibit high mobility on these surfaces due to the ultra-low adhesion, which leads to minimal sample loss and contamination. Although droplet manipulation has been demonstrated using electric fields, magnetic fields, guiding tracks and wettability gradients, to the best of our knowledge, there are no reports of droplet manipulation methods that can sort droplets by surface tension on super-repellent surfaces. In this work, we utilized tunable superomniphobic surfaces (i.e., surfaces that are extremely repellent to virtually all liquids) to develop a simple device with precisely tailored solid surface energy domains that, for the first time, can sort droplets by surface tension. Droplet sorting occurs on our device entirely due to a balance between the work done by gravity and the work expended due to adhesion, without the need for any external energy input. Our device can be fabricated easily in a short time and is particularly useful for in-the-field and on-the-go operations, where complex analysis equipment is unavailable. We envision that our methodology for droplet sorting will enable inexpensive and energy-efficient analytical devices for personalized point-of-care diagnostic platforms and lab-on-a-chip systems.

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