*Supplementary Materials*

**Lateral Retention of Water Droplets on Solid Surfaces without Gravitational Effect**

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B)

A)

Figure S1: Furmidge calculated retention force of 4 μL water drop sliding on A) copper surface and B) PDMS surface. The difference between measured retention force and calculated retention force may result from the difference between real width and the value of length of the drop which is substituted in the calculation.

There are two parameters, angular velocity *ω* and tilting angle α, that affect the normal force and lateral force. For our apparatus, the centrifugal arm rotates from 0 rpm; namely, the angular velocity *ω* increases from 0. To achieve zero normal force (0g: $f\_{⊥,0g}$ = 0), $mgcosα= mω^{2}Lsinα$, we have $α=arctan\left(-\frac{g}{ω^{2}L}\right)$. The rotation of centrifugal arm and tilting angle are controlled by two motors independently; therefore, changing angular velocity *ω* and tilting angle α simultaneously implements constant normal force in our case. As angular velocity and tilting angle change all the time, Figure S2 shows the change of tilting angle α with increasing angular velocity *ω* for 0g cases.

Figure S2: Tilting angle and angular velocity during rotation for 0g cases.

Table S1: Bo number of water drops with different volumes on copper surface and PDMS surface.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 3 μL | 4 μL | 5 μL | 6 μL |
| Copper | 0.20 | 0.25 | 0.28 | 0.34 |
| PDMS | 0.15 | 0.18 | 0.22 | 0.25 |