Droplets sliding down a vertical surface under increasing horizontal forces

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Supporting Information

- Centrifugal Adhesion Balance

More details of CAB are shown in Figure S1. Figure S1(b) shows the details of the goniometer inside the chamber. The camera is installed in the chamber as shown in Figure S1(b). A mirror is mounted in 45° to reflect the side view of the drop and the camera is set perpendicular to the surface. The camera and the sample stage are fixed in the chamber, so the tilting of the sample stage is driven by the rotation of the chamber. This new CAB model, is compact, and allows measuring retention forces in a controlled humidity environment, or any environment of other

vapors. The size and number of satellite drops placed in the designated location, determine the humidity in the chamber.
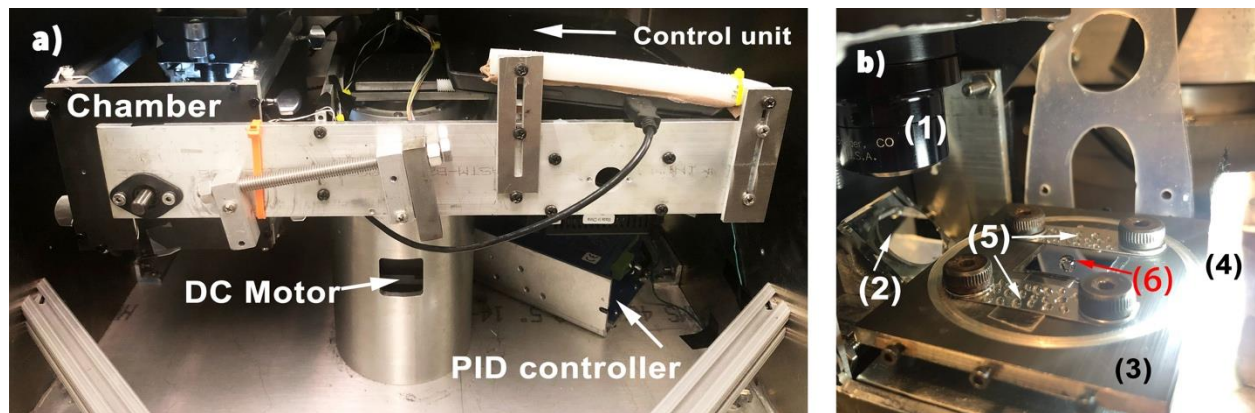

Figure S1. Images of the Centrifugal Adhesion Balance. a) Structure of CAB, b) details of the goniometer inside the chamber. (1) Camera (lens), (2) mirror (45 ° tilted), (3) sample stage, (4) light source, (5) satellite drops, and (6) central drop.

- Rotation of the CAB

Angular velocity of the rotation is increased at the rate of 0.6 rpm/s. The centrifugal force is continuously increasing while lateral force keeps consistent as shown in Figure S2.
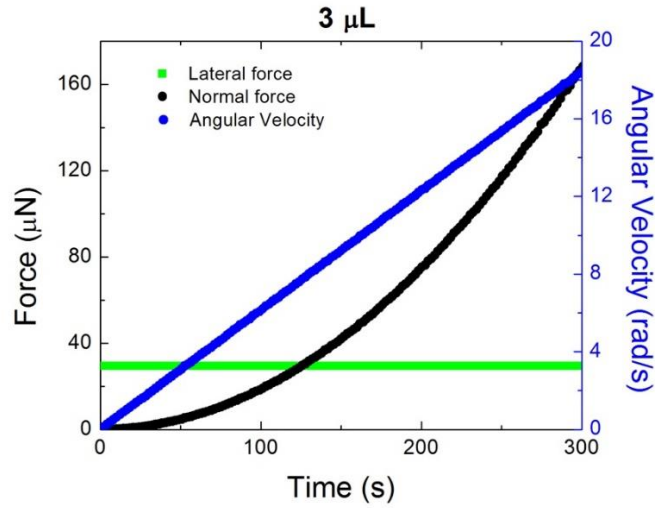

Figure S2. Angular velocity of the rotation, normal (centrifugal) force and lateral (gravitational) force against time for a 3 µL water drop.

- Drop pull-away (flying drop)

Figure S3. Sequence of pictures of a 2 μL pulled water drop that mostly moved slowly at the first stage (c.f. Figure 4) so that by the time it finally reached the third stage, it flew away instead of sliding down. (Video 3)