Electronic Supplementary Material (ESI)

Controlling the Contact Angle of Biological Sessile Drops for Study of Their Desiccated Cracking Patterns

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1. **Contact angle defines the shape of the space inside the sessile drop**

For a sessile drop on a solid surface, the initial contact angle (θ) can be used to define the shape of the space inside the sessile drop, as shown in Fig. S1. The initial height of the drop apex (h) and the drop volume (V) can be written as [1-3]:

$$h = R\tan(\frac{\theta}{2}) \quad \text{(S1)}$$

$$V = \frac{\pi(2+\cos\theta)(1-\cos\theta)^2 R^3}{3\sin^3\theta} = \frac{1}{6}\pi h(h^2+3R^2) \quad \text{(S2)}$$

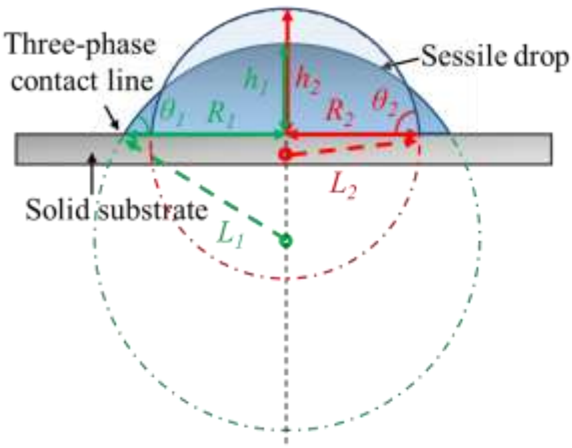

Figure S1. Schematic of the shape of the space inside the sessile drop defined by its initial contact angle.

2. **Controllability and reproducibility of the modified glass surface for desiccation study of biological sessile drops**

Fig. S2 shows the initial contact angles (θ) of the blood sessile drops on the modified glass surfaces and the blood desiccation patterns observed on the surfaces. The uncertainty of each controlled initial contact angle (θ) was determined to be less than 4°. The sources of the error are likely come from the error of the micropipette which was used to volumetrically deliver the sessile drop, the error in capturing the sessile drop image using the contact angle software, and the cutting tips of the plotter cutter. The blood sessile drops desiccated on the modified glass surfaces present the reproducible desiccation patterns for each of the controlled contact angles, as shown in Fig. S2. These blood desiccation patterns demonstrated their clearly dependence on the initial contact angles. For a same controlled contact angle, repeated desiccation experiments showed consistent characteristic morphologies. The detailed morphologies in different regions of these blood desiccation patterns have been illustrated in Fig. 3-6. All of these experimental results indicate the high precision of the so-modified glass surface on controlling the drop contact angle and the potential of this method to obtain the reproducible biological desiccation patterns for the normalization of the desiccation analysis in the future research.

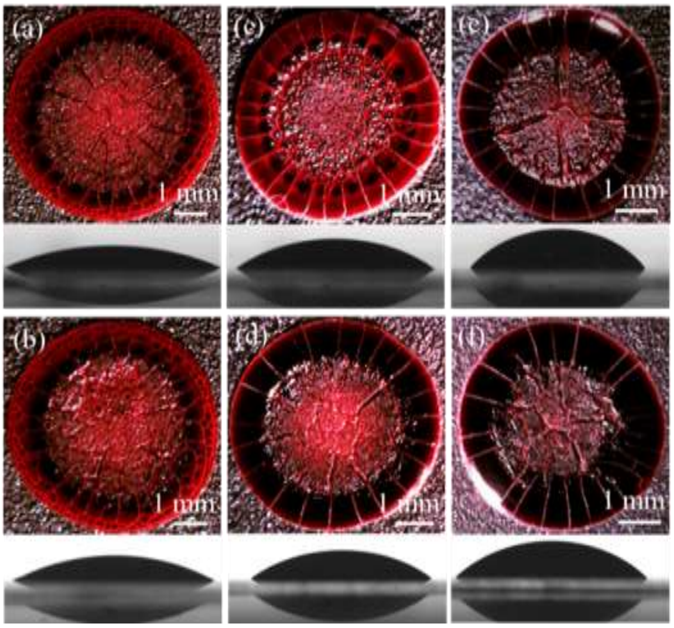

Figure S2. Controllability of the initial contact angle (θ) of the blood sessile drops and reproducibility of the blood desiccation patterns on the so-modified glass surfaces: (a) & (b) θ = 20°; (c) & (d) θ = 35°; (e) & (f) θ = 50°.

3. References

[1] H.Y. Erbil, Evaporation of pure liquid sessile and spherical suspended drops: A review, *Advances in Colloid and Interface Science*, 2012, **170**, 67-86.
[2] V. Soulie, S. Karpitschka, F. Lequien, P. Prene, T. Zemb, H. Moehwald, H. Riegler, The evaporation behavior of sessile droplets from aqueous saline solutions, *Physical Chemistry Chemical Physics*, 2015, **17**, 22296-22303.
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