

Supplementary Information for:

Probing Substrate Effects on Relaxation Dynamics of
Ultrathin Poly(vinyl acetate) Films by Dynamic Wetting
of Water Droplets on Their Surfaces

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Section 1: Surface topographies of PVAc films on substrates with various hydroxyl contents

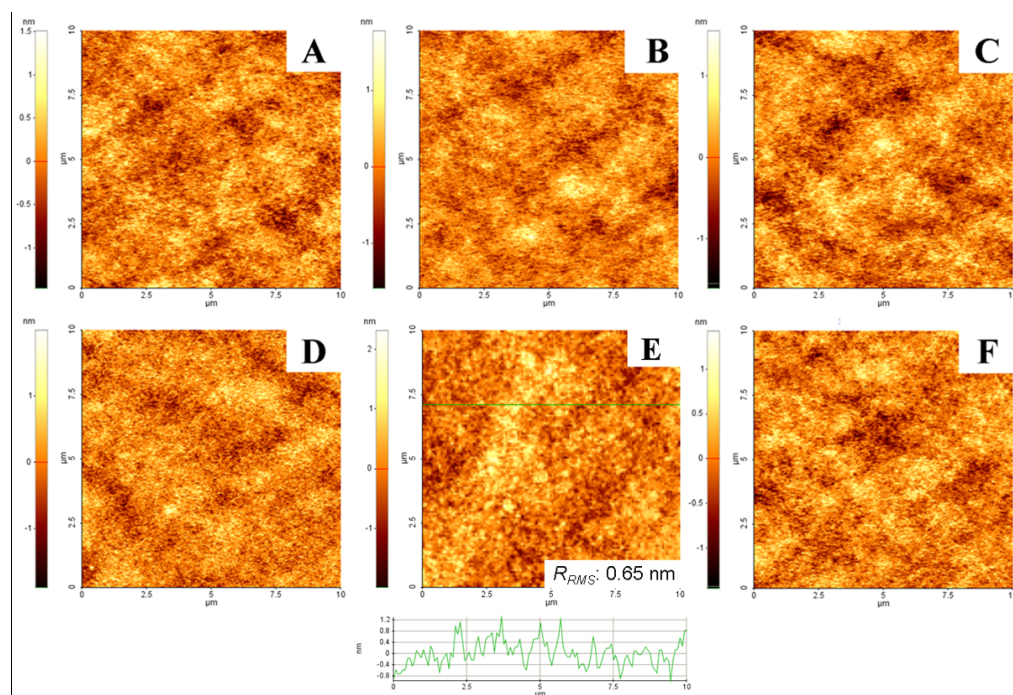


Figure S1. AFM morphology images of PVAc thin films ($6\pm 2\text{nm}$) spin coated on substrates with different hydroxyl content: (a) 29% (b) 43.6% (c) 65.4% (d) 76.5% (e) 85.7% (f) 100%

Figure S1 illustrates the AFM topographies images for the 6 nm PVAc films deposited on substrates with various surface hydroxyl content. It is seen from Figure S1 that all these surfaces of PVAc ultra-thin films are smooth with RMS roughness less than 5 nm, being insufficient to affect the water spreading on the surface^{1,2}.

Section 2: Advancing contact angle behavior of water droplets on the surface of thin PVAc films with various thickness

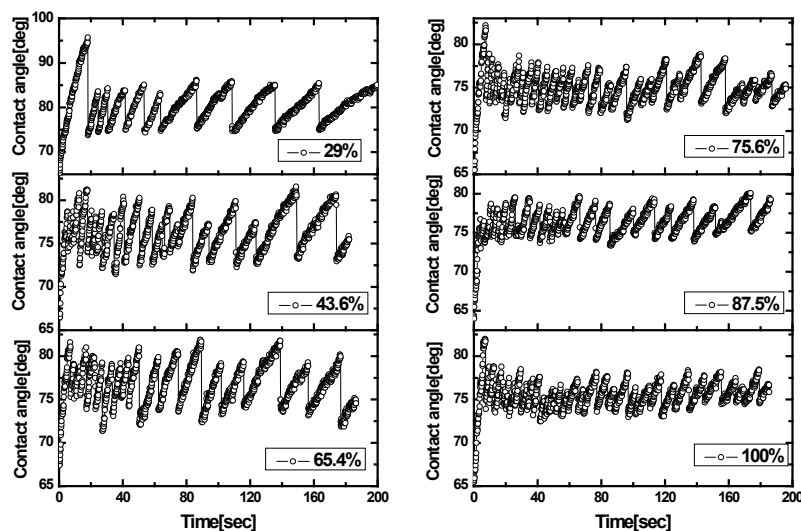


Figure S2. Advancing contact angles of water on the surface of thin PVAc films ($20\pm 3\text{nm}$)

supported on substrates with different hydroxyl content as a function of time.

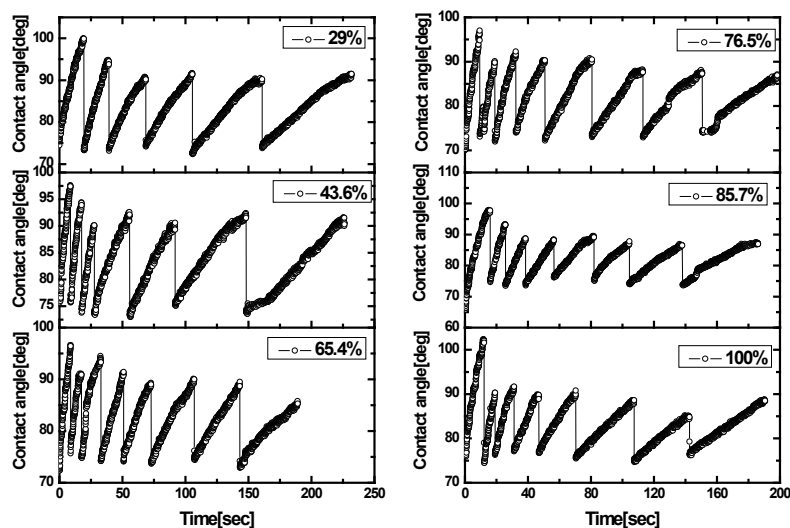


Figure S3. Advancing contact angles of water on the surface of thin PVAc films ($35\pm 2\text{nm}$)

supported on substrates with different hydroxyl content as a function of time.

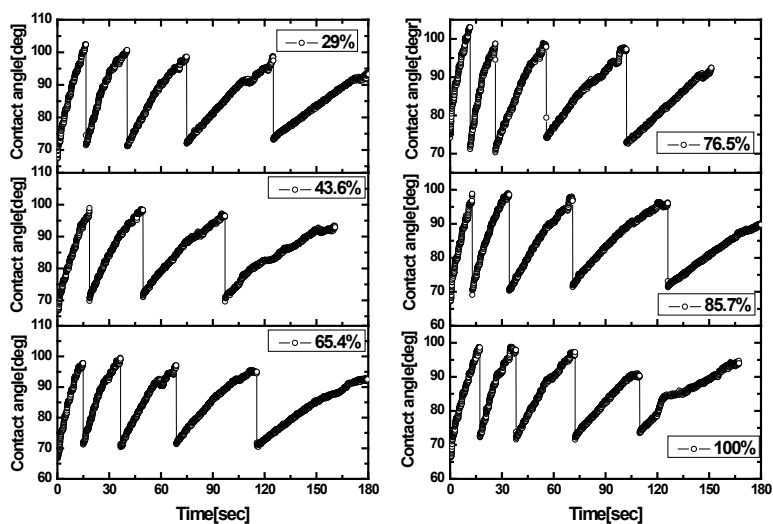


Figure S4. Advancing contact angles of water on the surface of PVAc thin films ($47\pm 3\text{nm}$)

supported on substrates with different hydroxyl content as a function of time.

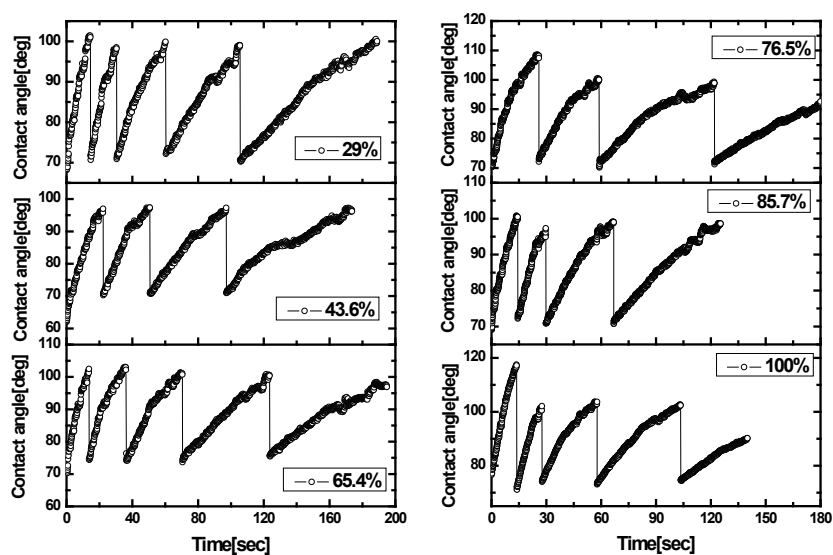


Figure S5. Advancing contact angles of water on the surface of thin PVAc films ($76\pm 3\text{nm}$)

supported on substrates with different hydroxyl content as a function of time.

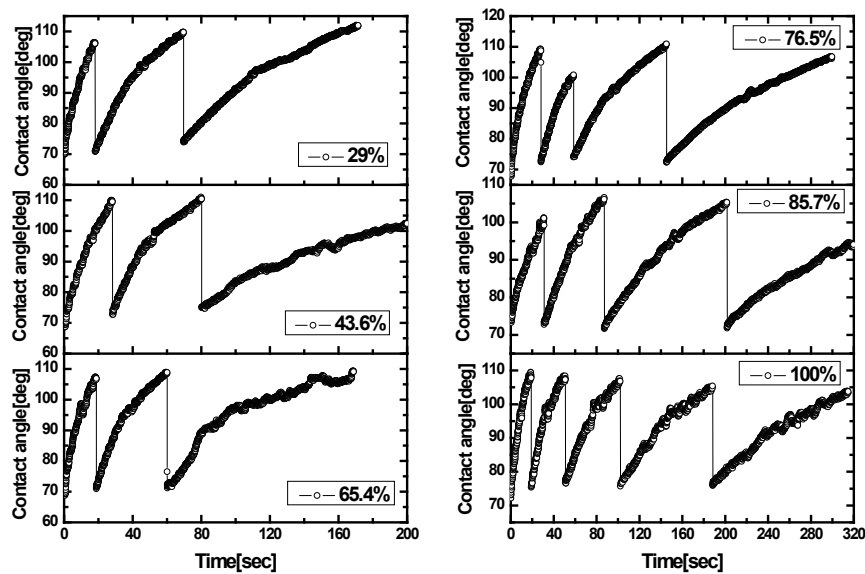


Figure S6. Advancing contact angles of water on the surface of thin PVAc films ($118\pm 3\text{nm}$) supported on substrates with different hydroxyl content as a function of time.

Section 3: Correlations between the jumping angle and the substrate surface hydroxyl content for PVAc films of various thickness

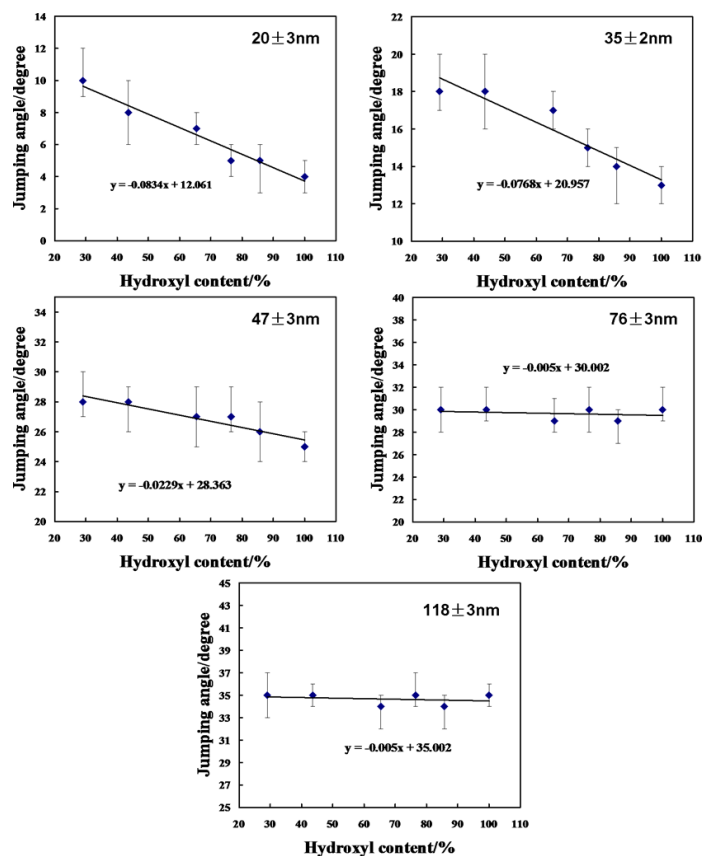


Figure S7. Jumping angle plotted as a function of hydroxyl content on the substrate with different film thickness

Section 4: Plots of film thickness normalized by the value at 25°C as a function of temperature for PVAc films

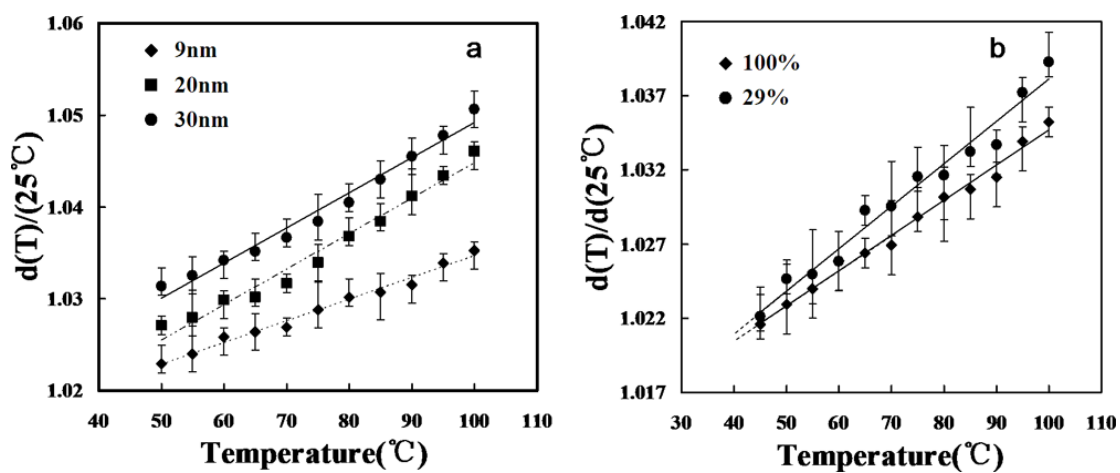


Figure S8. Plots of film thickness normalized by the value at 25°C as a function of temperature for PVAc films: (a) Films with different thickness supported on the substrate completely covered by hydroxyl groups. (b) PVAc films supported on the substrate surfaces with 29% and 100% hydroxyl groups (9 ± 2nm).

Section 5: Force-Distance curves of ultrathin PVAc films supported on substrates with different hydroxyl content

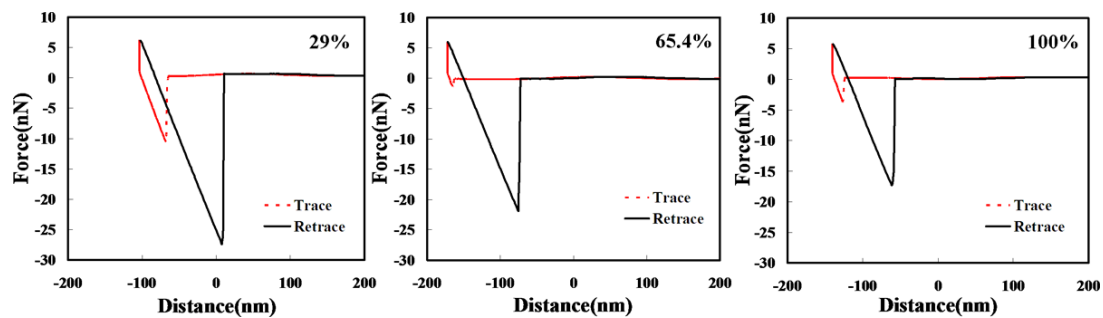


Figure S9. Force-Distance curves of PVAc films (6 ± 2 nm) supported on substrates with different hydroxyl content.

References:

- (1) H. J. Busscher, A. W. J. van Pelt, P. de Boer, H. P. de Jong and J. Arends, *Colloids and Surfaces*, 1984, **9**, 319-331.
- (2) H. Tavana, D. Jehnichen, K. Grundke, M. L. Hair and A.W. Neumann, *Advances in Colloid and Interface Science*, 2007, **134-135**, 236-248.