

Description of Additional Supplementary Files

File Name: Supplementary Movie 1

Description: Wetting transitions on microtextured silica surfaces with Circ|SC|100 cavities under hexadecane ($\theta_o \approx 20^\circ$). (Scale: Cavity diameter is 200 μm)

File Name: Supplementary Movie 2

Description: Wetting transitions on microtextured silica surfaces with Sq|SC|3 cavities under hexadecane ($\theta_o \approx 20^\circ$). (Scale: Cavity edge length is 200 μm)

File Name: Supplementary Movie 3

Description: Wetting transitions on microtextured silica surfaces with Sq|SC|50 cavities under hexadecane ($\theta_o \approx 20^\circ$). (Scale: Cavity edge length is 200 μm)

File Name: Supplementary Movie 4

Description: Wetting transitions on microtextured silica surfaces with Hex|SC|3 cavities under hexadecane ($\theta_o \approx 20^\circ$). (Scale: Cavity length is 200 μm)

File Name: Supplementary Movie 5

Description: Wetting transitions on microtextured silica surfaces with Hex|SC|50 cavities under hexadecane ($\theta_o \approx 20^\circ$). (Scale: Cavity length is 200 μm)

File Name: Supplementary Movie 6

Description: Wetting transitions on microtextured silica surfaces with Circ|SC|100 cavities underwater ($\theta_o \approx 40^\circ$). (Scale: Cavity diameter is 200 μm)

File Name: Supplementary Movie 7

Description: Wetting transitions on plasma treated microtextured silica surfaces with Circ|DRC|100 cavities in underwater ($\theta_o \approx 0^\circ$). Meniscus is stabilized at doubly reentrant edge ($\sim 1\text{s}$), but rapid formation of capillary condensed water inside the cavity wall triggers main water meniscus to enter inside the cavity and the trapped air bubble experiences less pinning force and leaves the cavity due to buoyancy. (Scale: Cavity diameter is 200 μm)