

Supporting Information

The Liquid Young's Law on SLIPS: Liquid-Liquid Interfacial Tensions and Zisman Plots

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Table S1. Apparent contact angle and surface tension results for the alkane droplet series on Krytox-infused Teflon AF substrate with $\gamma_{L_iV} = 17.41 \pm 0.02$ mN/m. The droplet liquid type, apparent contact angle, droplet liquid-vapour surface tension, infused-liquid-vapour surface tension, spreading coefficient, and liquid-liquid interfacial tension between the droplet liquid and the infused-liquid are given by L_d , θ_{app} , γ_{L_dV} , $S_{L_iL_d(V)}$ and $\gamma_{L_dL_i}$, respectively. $S_{L_iL_d(V)}$ shows two possible cases according to eq 8 and indicates the case consistent with conditions from eq 9. Contact angle and surface tension measurements were carried at temperatures between 19-21°C.

L_d	θ_{app} [°]	γ_{L_dV} [mN/m]	$S_{L_iL_d(V)}$ [mN/m]		Cloaked (Y/N)	$\gamma_{L_dL_i}$ [mN/m] SLIPS Contact Angle Method	$\gamma_{L_dL_i}$ [mN/m] Pendant Drop Method
			Non-cloaked	Cloaked			
Pentane (C ₅ H ₁₂)	34.7±1.7	17.20	-3.49	-1.91	N	3.28±0.32	2.52±0.03
Hexane (C ₆ H ₁₄)	44.5±0.9	18.60	-2.95	-1.72	N	4.14±0.22	3.57±0.04
Heptane (C ₇ H ₁₆)	50.8±0.8	20.14	-1.96	-1.20	N	4.69±0.24	4.58±0.01
Octane (C ₈ H ₁₈)	55.5±1.0	21.40	-1.29	-0.82	N	5.28±0.32	5.38±0.01
Nonane (C ₉ H ₂₀)	58.9±1.1	22.37	-0.90	-0.59	N	5.86±0.40	6.13±0.04
Decane (C ₁₀ H ₂₂)	60.9±1.4	23.60	0.27	0.18	Y	6.01±0.34	6.50±0.05
Undecane (C ₁₁ H ₂₄)	63.9±0.5	24.66	0.68	0.47	Y	6.78±0.14	7.10±0.01
Dodecane (C ₁₂ H ₂₆)	65.8±0.8	25.35	0.92	0.65	Y	7.29±0.23	7.60±0.01
Tridecane (C ₁₃ H ₂₈)	67.5±0.5	25.90	0.98	0.71	Y	7.78±0.16	8.10±0.01
Hexadecane (C ₁₆ H ₃₄)	69.8±0.4	27.20	1.76	1.31	Y	8.48±0.13	8.99±0.01

Table S2. Apparent contact angle and surface tension results for the IPA-water droplet series on Krytox-infused Glaco substrate with $\gamma_{L_iV} = 17.41 \pm 0.02$ mN/m. The %IPA for the droplet, apparent contact angle, droplet liquid-vapour surface tension, infused-liquid-vapour surface tension, spreading coefficient, and liquid-liquid interfacial tension between the droplet liquid and the infused-liquid are given by L_d %IPA, θ_{app} , γ_{L_dV} , $S_{L_iL_d(V)}$ and $\gamma_{L_dL_i}$, respectively. $S_{L_iL_d(V)}$ shows two possible cases according to eq 8 and indicates the case consistent with conditions from eq 9. The droplet liquid-vapour surface tension data were taken from Park *et al.*^{S1} Contact angle and surface tension measurements were carried at temperatures between 19-21°C.

L_d %IPA vol/vol	θ_{app} [°]	γ_{L_dV} [mN/m]	$S_{L_iL_d(V)}$ [mN/m]		Cloaked (Y/N)	$\gamma_{L_dL_i}$ [mN/m] SLIPS Contact Angle Method	$\gamma_{L_dL_i}$ [mN/m] Pendant Drop Method
			Non- cloaked	Cloaked			
0	119.6±0.3	72.71	1.94	3.84	Y	51.46±0.78	51.41±0.30
1	117.6±0.3	67.33	1.31	2.44	Y	47.49±0.61	48.61±0.26
2	116.0±0.2	62.15	0.10	0.17	Y	44.57±0.48	44.10±0.15
3	114.3±0.4	57.71	-0.87	-1.48	N	41.17±0.43	41.16±0.11
4	112.6±0.5	53.94	-1.60	-2.60	N	38.13±0.46	38.10±0.37
5	111.7±0.3	50.75	-2.86	-4.54	N	36.20±0.26	35.69±0.08
6	110.6±0.4	48.04	-3.67	-5.66	N	34.30±0.35	34.36±0.13
7	109.0±0.4	45.71	-4.00	-5.94	N	32.30±0.38	32.68±0.22
8	108.8±0.4	43.69	-5.24	-7.74	N	31.52±0.32	31.79±0.24
9	106.7±0.7	41.94	-4.95	-6.95	N	29.48±0.56	30.53±0.22
10	105.4±0.3	40.40	-5.12	-6.97	N	28.11±0.25	28.88±0.11
12	102.5±0.6	37.83	-5.20	-6.64	N	25.63±0.43	26.72±0.05
14	101.0±0.8	35.79	-5.85	-7.23	N	24.23±0.50	24.62±0.08
16	98.7±0.7	34.13	-5.83	-6.86	N	22.54±0.43	22.66±0.09
18	95.6±1.6	32.75	-5.29	-5.87	N	20.63±0.96	20.70±0.07
20	93.0±1.3	31.60	-4.86	-5.13	N	19.05±0.73	19.16±0.10

Table S3. Apparent contact angle and surface tension results for the IPA-water droplet series on silicone oil-infused Glaco substrate with $\gamma_{L_iV} = 20.22 \pm 0.05$ mN/m. The %IPA for the droplet, apparent contact angle, droplet liquid-vapour surface tension, infused-liquid-vapour surface tension, spreading coefficient, and liquid-liquid interfacial tension between the droplet liquid and the infused-liquid are given by L_d %IPA, θ_{app} , γ_{L_dV} , $S_{L_iL_d(V)}$ and $\gamma_{L_dL_i}$, respectively. $S_{L_iL_d(V)}$ shows two possible cases according to eq 8 and indicates the case consistent with conditions from eq 9. The droplet liquid-vapour surface tension data were taken from Park *et al.*^{S1} Contact angle and surface tension measurements were carried at temperatures between 19-21°C.

L_d %IPA vol/vol	θ_{app} [°]	γ_{L_dV} [mN/m]	$S_{L_iL_d(V)}$ [mN/m]		Cloaked (Y/N)	$\gamma_{L_dL_i}$ [mN/m] SLIPS Contact Angle Method	$\gamma_{L_dL_i}$ [mN/m] Pendant Drop Method
			Non- cloaked	Cloaked			
0	108.3±0.5	72.71	9.44	13.73	Y	38.76±0.82	38.10±0.70
1	107.9±0.4	67.33	6.17	8.92	Y	38.20±0.63	36.54±0.17
2	106.0±0.5	62.15	4.59	6.34	Y	35.60±0.70	34.30±0.27
3	104.6±0.6	57.71	2.69	3.60	Y	33.89±0.78	32.44±0.23
4	102.4±0.3	53.94	1.92	2.44	Y	31.28±0.37	30.96±0.20
5	102.3±0.2	50.75	-0.45	-0.57	N	30.98±0.27	29.89±0.17
6	100.5±0.5	48.04	-1.11	-1.36	N	28.94±0.44	28.58±0.17
7	98.8±0.6	45.71	-1.68	-1.99	N	27.18±0.51	26.63±0.13
8	97.8±0.7	43.69	-2.69	-3.12	N	26.17±0.56	25.55±0.09
9	96.3±0.3	41.94	-3.06	-3.43	N	24.78±0.27	24.57±0.09
10	94.5±1.2	40.40	-3.22	-3.49	N	23.40±0.91	23.79±0.13
12	92.3±0.4	37.83	-4.10	-4.26	N	21.71±0.96	21.75±0.15
14	89.3±0.9	35.79	-4.21	-4.16	N	19.78±0.61	20.29±0.17
16	86.6±1.5	34.13	-4.29	-4.05	N	18.20±0.92	18.75±0.12
18	83.0±1.3	32.75	-3.67	-3.27	N	16.20±0.76	17.23±0.10
20	80.2±1.9	31.60	-3.47	-2.97	N	14.85±1.08	15.82±0.19

Table S4. Summary of literature data used in Figure 2. The droplet liquid, infusing liquid, apparent contact angle, droplet liquid-vapour surface tension, infused-liquid-vapour surface tension, spreading coefficient, and liquid-liquid interfacial tension between the droplet liquid and the infused-liquid are given by L_d , L_i , θ_{app} , γ_{L_dV} , $S_{L_iL_d(V)}$ and $\gamma_{L_iL_d}$, respectively. The $S_{L_iL_d(V)}$ and $\gamma_{L_iL_d}$ calculations, and the cloaking decisions were produced using eq 8 and eq 9.

Solid surface	L_d	L_i	θ_{app} [°]	γ_{L_dV} [mN/m]	γ_{L_iV} [mN/m]	$S_{L_iL_d(V)}$ [mN/m]	Cloaked (Y/N)	$\gamma_{L_iL_d}$ [mN/m] SLIPS Contact Angle Method	$\gamma_{L_iL_d}$ [mN/m] Pendant Drop Method	Ref.
S. Epoxy	Water	FC-70	113.1±2.8	72.4±0.1	17.1±0.3	16.12	Y	39.18±5.21	56.0±0.9	[S2]
	Hexadecane (C ₁₆ H ₃₄)		70.5±2.0	27.2±0.2		1.56	Y	8.54±0.81	8.2±0.2	
	Tridecane (C ₁₃ H ₂₈)		63.5±2.8	25.9±0.1		2.25	Y	6.55±0.87	7.7±0.3	
	Decane (C ₁₀ H ₂₂)		60.0±2.8	23.6±0.1		0.80	Y	5.70±0.78	6.7±0.2	
	Octane (C ₈ H ₁₈)		50.7±3.0	21.4±0.2		0.46	Y	3.84±0.62	4.4±0.2	
	Hexane (C ₆ H ₁₄)		40.1±4.2	18.6±0.5		-1.37	N	2.87±0.86	2.6±0.1	
	Pentane (C ₅ H ₁₂)		30.8±3.1	17.2±0.5		-2.23	N	2.33±0.38	2.5±0.1	
Epoxy	Water	FC-70	92.6±1.8	27.2±0.2	17.9	36.57	Y	18.73±1.57	56.0±0.9	[S3]
	Hexadecane (C ₁₆ H ₃₄)		30.6±0.4	25.9±0.1		8.82	Y	1.28±0.06	8.2±0.2	
	Tridecane (C ₁₃ H ₂₈)		26.9±1.7	23.6±0.1		7.82	Y	0.98±0.15	7.7±0.3	
	Decane (C ₁₀ H ₂₂)		14.2±0.7	21.4±0.2		6.23	Y	0.27±0.03	6.7±0.2	
	Octane (C ₈ H ₁₈)		7.9±0.7	27.2±0.2		4.22	Y	0.08±0.02	4.4±0.2	
Silica	Water	Silicone oil	124.3	72.1	17.9	-4.33	N	58.50	52.8±2.0	[S4]
	ethylene glycol		89.6	47.3		11.75	Y	17.70	28.2±3.0	
	Hexadecane (C ₁₆ H ₃₄)		58.5	28.0		4.49	Y	5.60	7.1±1.0	
PMP	Water	Silicone oil	110.0	72.4	20.6	9.78	Y	42.0	41.3	[S4]
Boehmite	Water	Mineral oil	105.4	72.4	30.0	-6.83	N	49.2	48.6	

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