Supplementary Information

Facile fabrication of stable wettability gradients on elastomeric surfaces for applications in water collection and controlled cell adhesion

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Figure S1. Temperature measurements using IR thermometer.

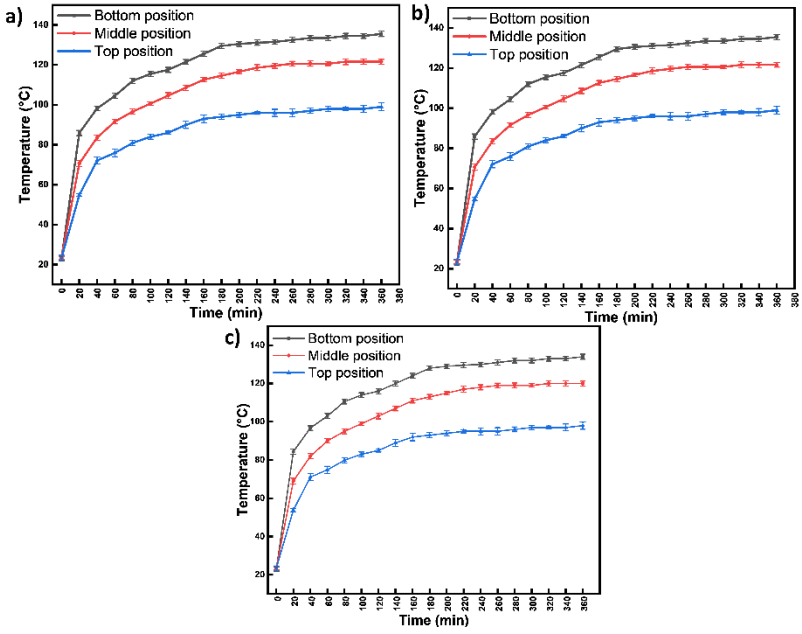


Figure S2. Time-temperature graph of a) metal surface, b) glass surface placed over metal piece, and c) PDMS surface supported on glass slide placed over metal piece.

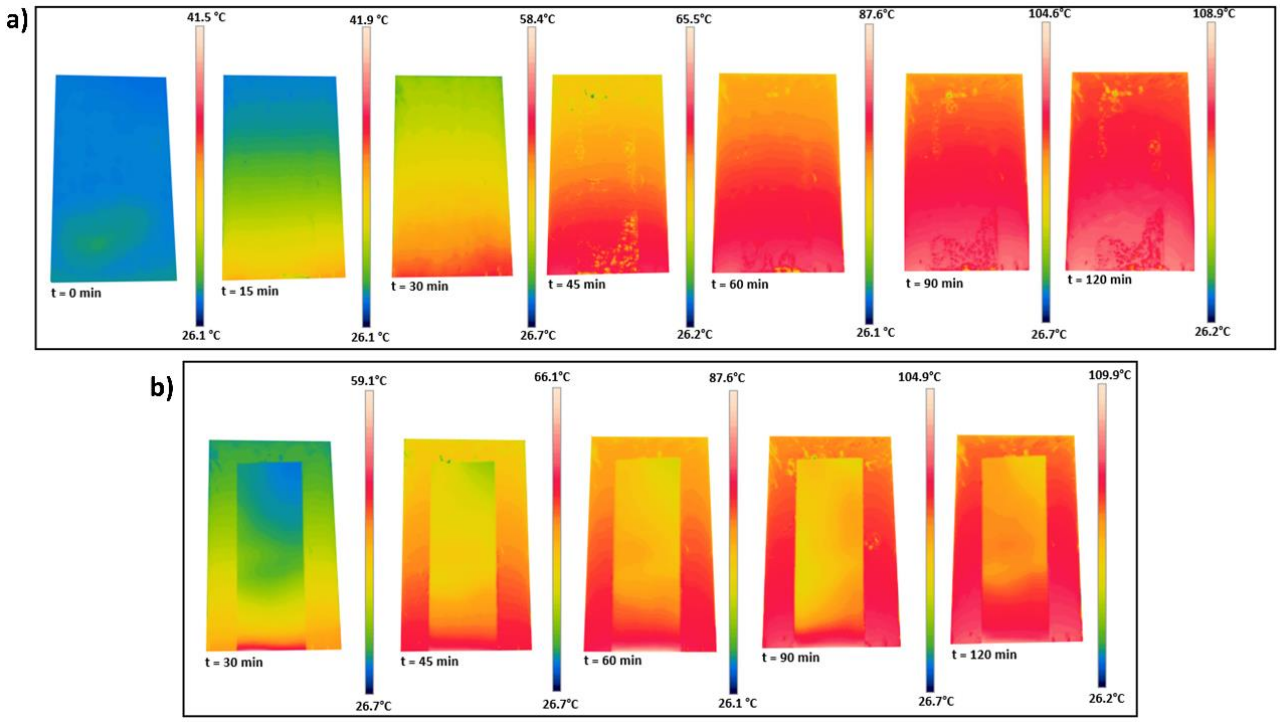
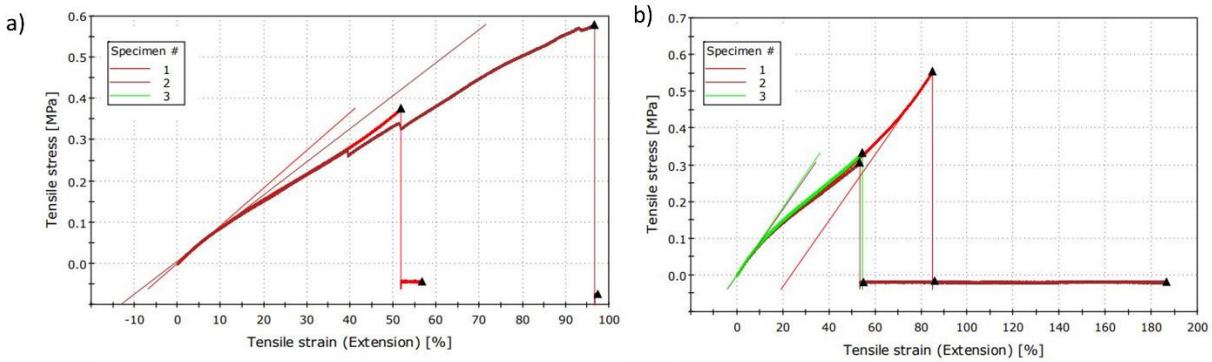


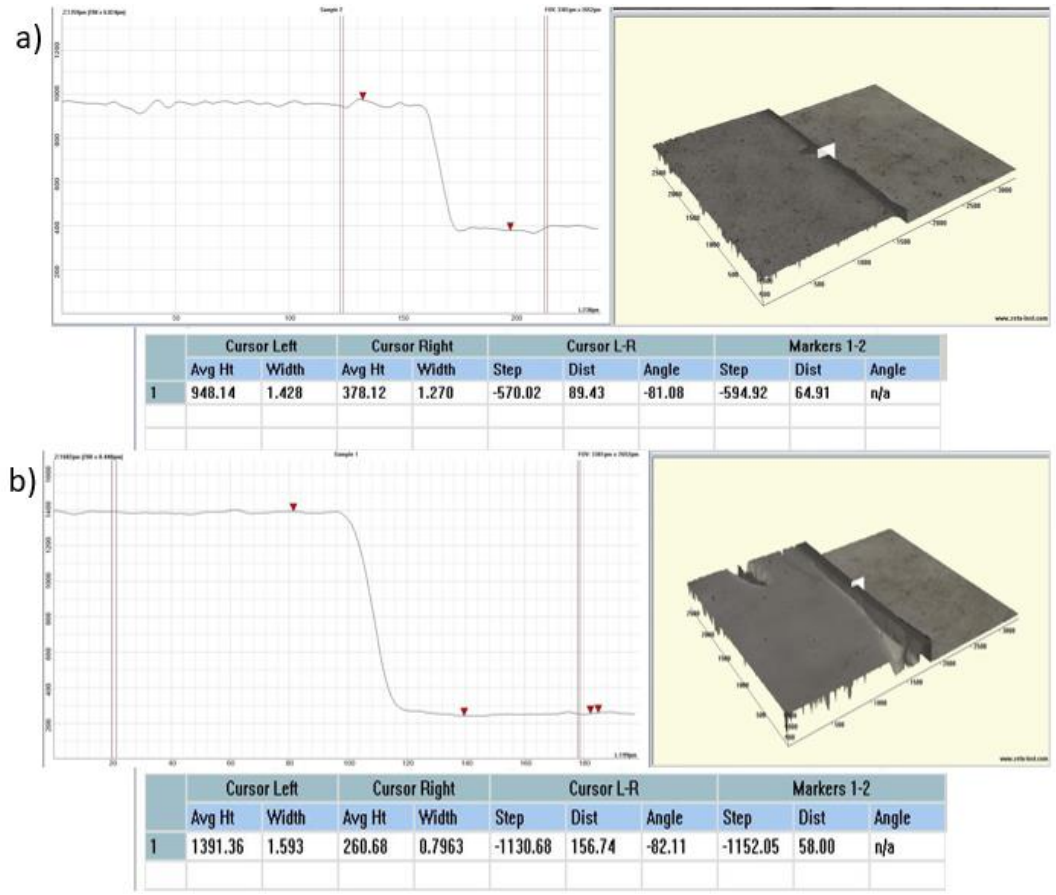
Figure S3. Thermal images of (a) slanted metal surface and (b) PDMS surface supported on glass slide placed over slanted metal surface, subjected to differential heating for different durations.



	Tensile Strength [MPa]	% Elongation at Break [mm/mm]	Modulus [MPa]	Width [mm]	Thickness [mm]
1	0.37745	0.56604	0.91409	20.0	1.000
2	0.57969	0.97231	0.80234	20.0	1.000
3	-----	-----	-----	20.0	1.000
Mean	0.47857	0.76918	0.85822	20.0	1.000

	Tensile Strength [MPa]	% Elongation at Break [mm/mm]	Modulus [MPa]	Width [mm]	Thickness [mm]
1	0.55537	0.85775	0.89563	20.0	1.000
2	0.30812	1.86	0.89659	20.0	1.000
3	0.33445	0.54903	0.92176	20.0	1.000
Mean	0.39931	1.09	0.90466	20.0	1.000

Figure S4. Stress-strain curves of PDMS samples with elastomer curing agent ratio (a) 20:1 and (b)15:1.



	Cursor Left		Cursor Right		Cursor L-R			Markers 1-2		
	Avg Ht	Width	Avg Ht	Width	Step	Dist	Angle	Step	Dist	Angle
1	948.14	1.428	378.12	1.270	-570.02	89.43	-81.08	-594.92	64.91	n/a

	Cursor Left		Cursor Right		Cursor L-R			Markers 1-2		
	Avg Ht	Width	Avg Ht	Width	Step	Dist	Angle	Step	Dist	Angle
1	1391.36	1.593	260.68	0.7963	-1130.68	156.74	-82.11	-1152.05	58.00	n/a

Figure S5. Thickness measurements of PDMS film a) ≈ 0.5mm thickness b) ≈ 1 mm thickness.

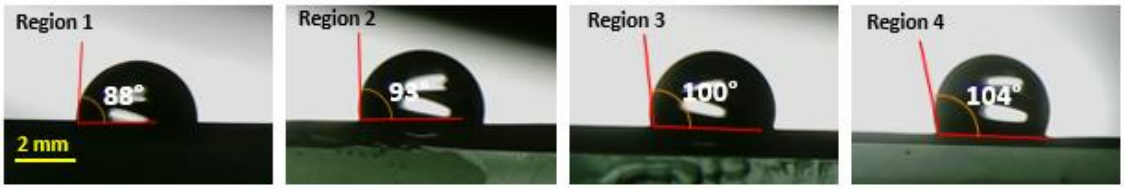


Figure S6. Contact angle measurements of wettability gradients formed on Ecoflex 00-30 Platinum Cure Silicone Rubber Compound.

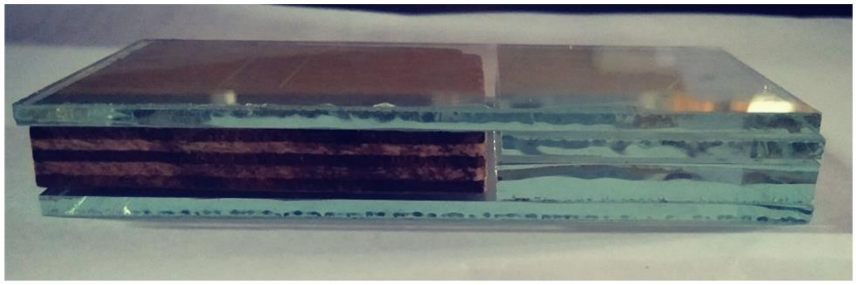


Figure S7. Experimental set up of differentially cured PDMS above a plane surface.

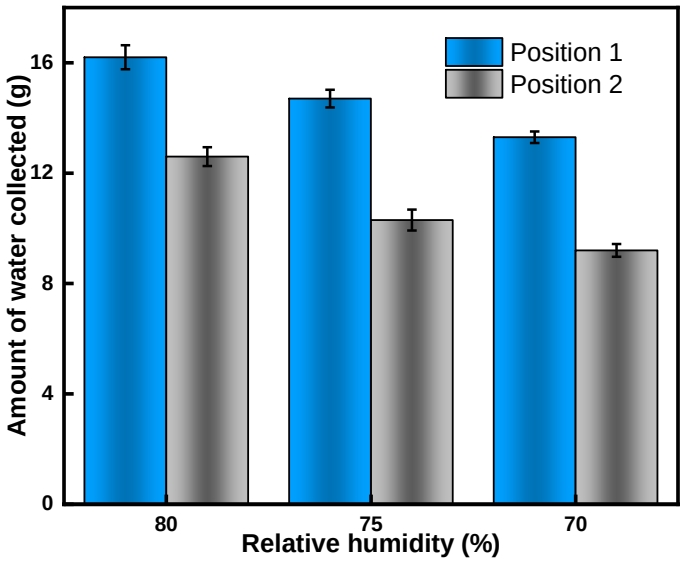


Figure S8. Overall amount of water collected over the period of 1 h with two different positions of wettability gradient samples at various relative humidities

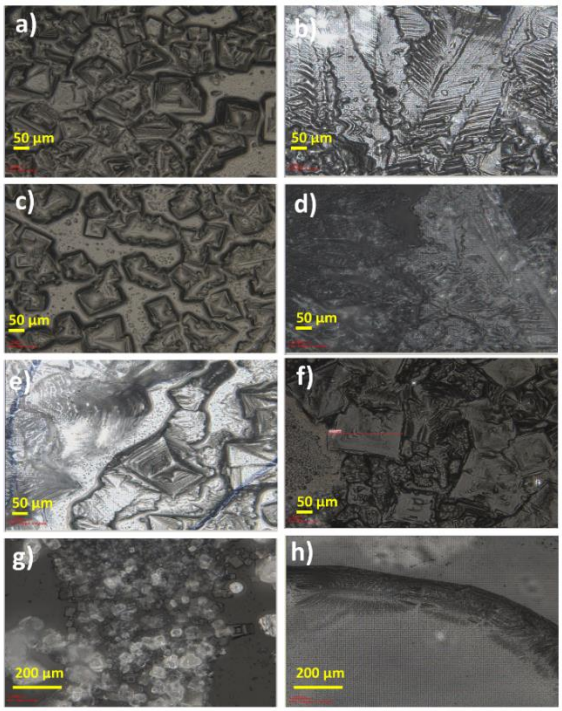


Figure S9 . a) Higher extend of salt crystallization from sugar-salt solution on less hydrophobic end on gradient film, b) Higher extend of sugar crystallization from sugar-salt solution on hydrophobic end on the gradient film, c) salt crystallization from salt solution on less hydrophobic end on gradient film, d) sugar crystallization from sugar solution on hydrophobic end on gradient film, e-f) crystallization from sugar-salt solution on different positions on a normal film, g) salt crystallization from salt solution on a normal film, h) sugar crystallization from sugar solution on a normal film.

Movie S1. Time taken for initial droplet nucleation and movement on the hydrophobic region of the gradient PDMS film.

Movie S2. Time taken for initial droplet nucleation and movement on the less hydrophobic region of the gradient PDMS film.

Movie S3. Time taken for initial droplet nucleation and movement on the plain PDMS film.

Table S1. Wettability gradient surfaces reported in the literature.

SI. No	Material Used	Fabrication method	Applications	Stability	Reference
1.	Polished silicon wafer 1992	Vapour diffusion	Droplet movement	Not mentioned	[1]
2.	Flat hydrophilic silicon dioxide surface 1986	Solvent diffusion	Protein and polymer adsorption	Not mentioned	[2]
3.	Oxidized silicon wafer	Microcontact printing	Microfluidics	Not mentioned	[3]
4.	Silicon wafer	UVO treatment	Secondary ion imaging	Not mentioned	[4]
5.	Poly(methyl methacrylate) sheet	Laser cutting	Electrolysis and gas collection	Not mentioned	[5]
6.	Brass sheet	Laser texturing	Chemical sensing	Super hydrophobicity after 17 days	[6]
7.	PDMS sheet	Photolithography and plasma etching	Underwater air bubble manipulation	Not mentioned	[7]
8.	Silicon wafer	Photolithography and deep reactive ion etching	Water vapor condensation	Not mentioned	[8]
9.	Graphite plate	Electrochemical oxidation	Water droplet manipulation	Not mentioned	[9]
10.	Aluminium plate	Gradual substrate moves and vapor deposition	Steam condensation heat transfer	Not mentioned	[10]
11.	Silicon wafer	Photolithography	Water droplet manipulation	Not mentioned	[11]
12.	Nickel-titanium sheet	Laser etching	Antiadhesion of protein and cells	Not mentioned	[12]
13.	Aluminium sheet	Laser scanning	Underwater air bubble manipulation	Not mentioned	[13]

14.	Glass	Printing and oil infusion	Water condensation, and dust-cleaning	Not mentioned	[14]
15.	Glass, cloth, and filter paper	Photolithography and UV treatment	Water droplet manipulation	Not mentioned	[15]
16.	Copper wires	Electrochemical corrosion combined with the gradual solution-rise method	Fog collection	Not mentioned	[16]
17.	Silicon wafer	Vapor diffusion	Steam condensation	Not mentioned	[17]
18.	Copper plate	Laser cutting and vapor deposition	Steam condensation heat transfer	Not mentioned	[18]
19.	Silicon wafer	Vapor diffusion	Manipulation of low surface tension fluids and their condensation	Not mentioned	[19]
20.	Polymer surfaces	3D printing	Control droplet movement	Not mentioned	[20]
21.	Elastomeric PDMS	Plasma exposure	Smart droplet-based assays	Not mentioned	[21]
22.	PDMS	Photolithography and soft lithography	Controlled droplet manipulation	Not mentioned	[22]

Table S2. Contact angle measurements of PDMS samples prepared with different amounts of curing agent.

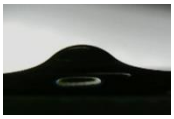
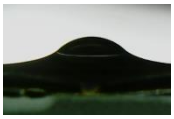
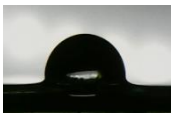
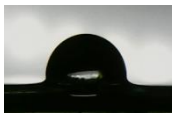
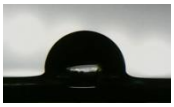
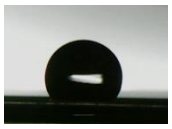
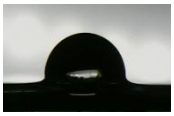
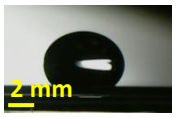
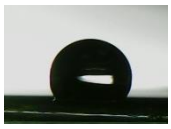
Time (min)	Contact angle measurements of samples cured at 80°C		
	PDMS : curing agent 10: 1	PDMS : curing agent 15: 1	PDMS : curing agent 20: 1
15	≈ 43° 	≈ 38° 	≈ 31° 
30	84° 	79° 	72° 
45	99° 	95° 	86° 
60	101° 	99° 	95° 

Table S3. Time-temperature study of PDMS placed over different substrates such as wood, glass and aluminium.

Time (min)	Temperature (°C)		
	Wood	Aluminium foil	Glass
0	26.7	26.9	26.3
15	31.5	32.4	34.9
30	53.5	56.7	70.9
45	58	63	77
60	75	79	106

Table S4. Temperature dependent curing time of PDMS (As per the technical data sheet of Sylgard 184, Dow Corning)

Si No.	Curing temperature (°C)	Time
1	25	48 hours
2	100	35 min
3	125	20 min
4	150	10 min

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