

Supporting Information

Mechanically Switchable Wetting Petal Effect in Self-Patterned Nanocolumnar Films on Poly(dimethylsiloxane)

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Figure S1. Schematic diagram of preparation process of the self-patterned nanocolumnar TiO₂ surfaces on PDMS foils

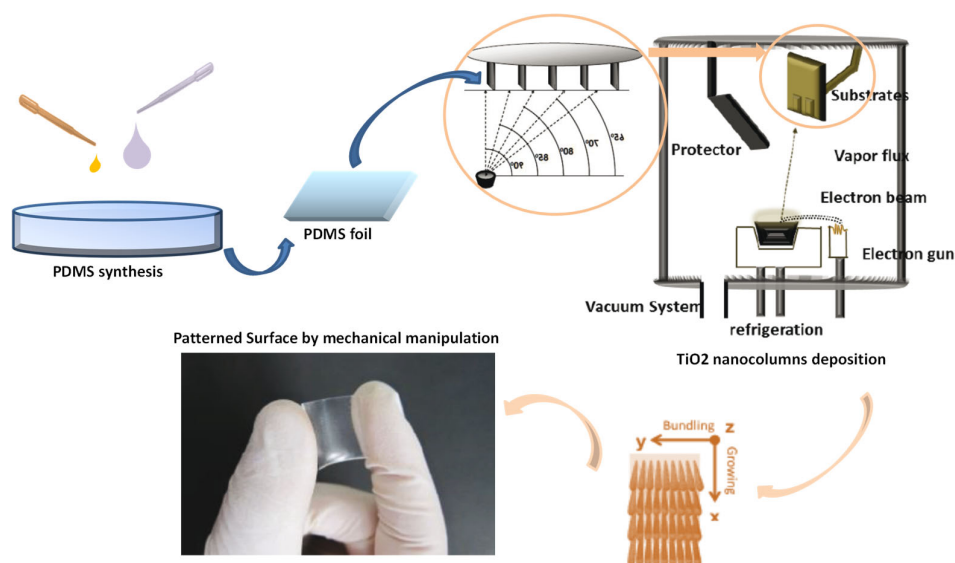


Figure S2. Cross section SEM micrographs of TiO_2 nanocolumnar films deposited at 60° (a) and 85° (b) of zenithal angle. Scheme of the growing and bundling directions according to the GLAD geometry.

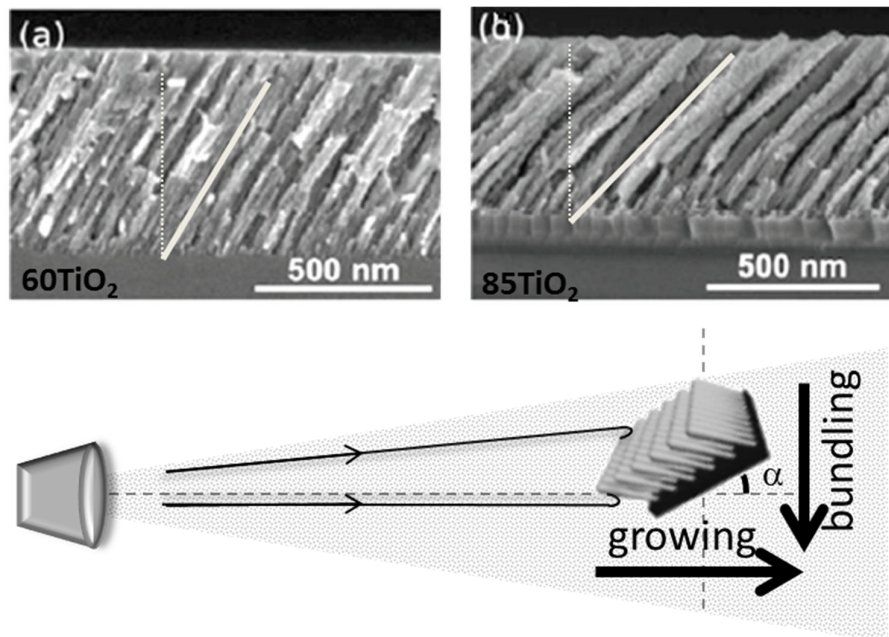


Figure S3. Phase contrast AFM images under convex bending and stretching to identify the microgroove region of exposed PDMS on the surface of the 85- TiO_2 /PDMS sample.

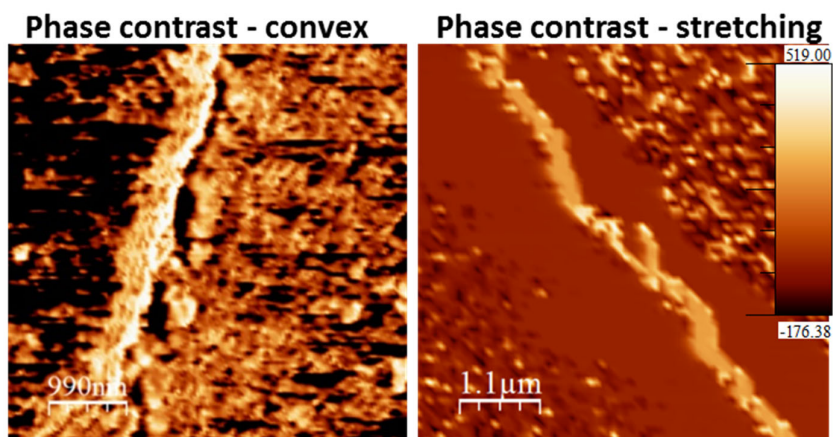


Figure S4. Water contact angles (WCA) and sliding angles along the parallel (ϕ^I , α^I) and normal (ϕ^N , α^N) directions of the microgrooves generated onto the nanocolumnar 60-TiO₂ /PDMS sample in function of the droplet volume. Corresponding values onto a reference PDMS foil for a 30 μ l water droplet are included for comparison.

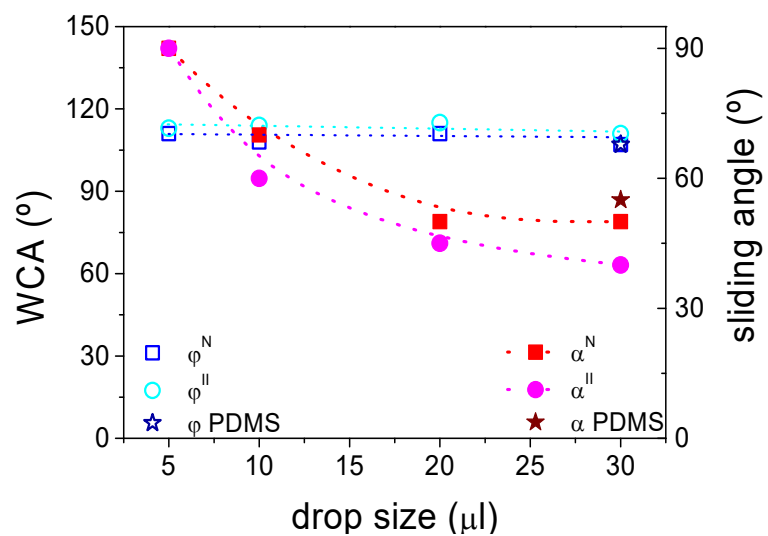


Figure S5. Selective water adhesion on PDMS, 60°-TiO₂/PDMS and 85°-TiO₂/PDMS surfaces in a convex bent configuration. Pictures report the behavior on bent configuration increasing the curvature from top to bottom in each couple of panels. Drop volume was 30 μ l.

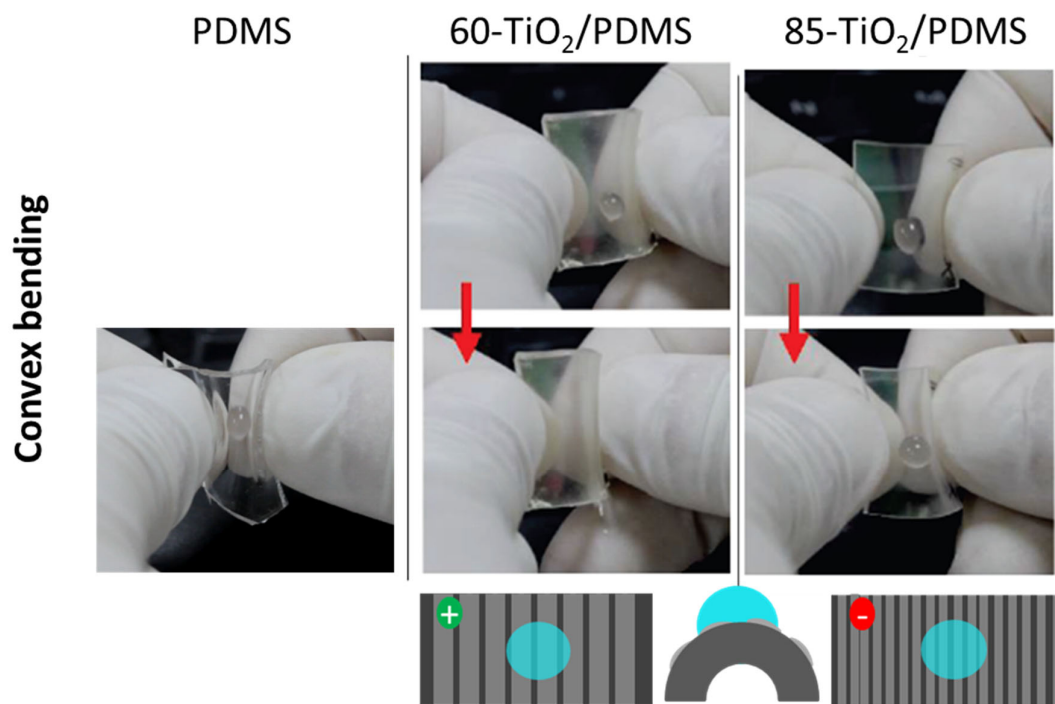


Table S1. Adhesion work of droplets on the different surface configurations for the TiO₂/PDMS samples and on the PDMS substrate.

Surface set-up	Water adhesion work [mN/m]			Diiodomethane adhesion work [mN/m]		
	PDMS	60-TiO ₂	85-TiO ₂	PDMS	60-TiO ₂	85-TiO ₂
flat	76	63	77	23	15	25
concave	64	60	82	15	24	18
convex	36	41	75	18	22	18
stretched	41	45	92	17	24	17

Table S2. Theoretical sliding angle α_{th} for a 30 μ l water droplet from the experimental minimum (ϕ_{min}) and maximum (ϕ_{max}) contact angles values before rolling off (see image on the left). Data correspond to a flat configuration under stretching for the PDMS substrate and the 60 $^\circ$ - and 85 $^\circ$ - TiO₂/PDMS surfaces.

sample		ϕ_{min} ($^\circ$)	ϕ_{max} ($^\circ$)	α_{th} ($^\circ$)
PDMS	flat	79	118	36
	stretched	94	123	27
60-TiO ₂	flat	83	126	41
	stretched	74	96	21
85-TiO ₂	flat	90	121	29
	stretched	60	87	23

