Electronic Supplementary Material (ESI) for Soft Matter.

Polydimethylsiloxane bilayer films with embedded spontaneous curvature.

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(Supplementary Information)

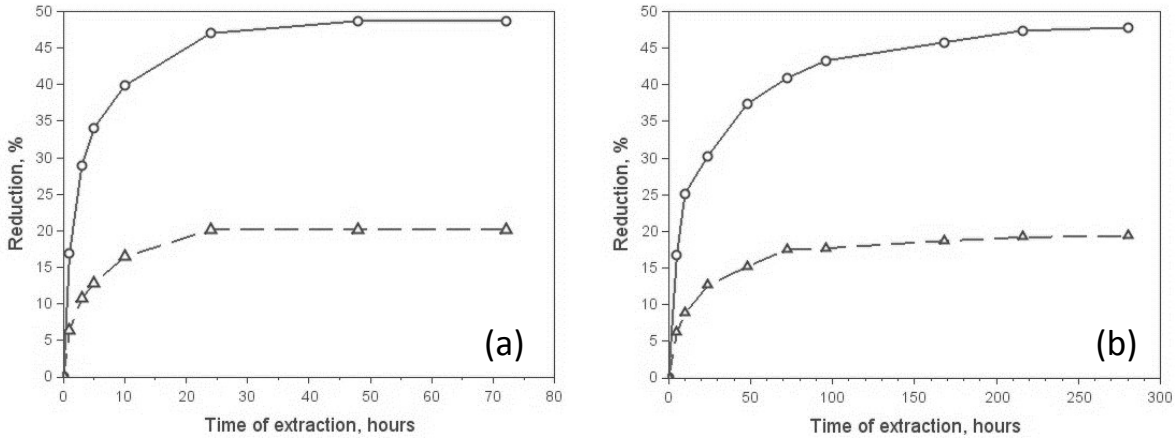

Fig.S1 The kinetics of extraction of silicone oil in an organic solvent bath for a 2 *mm*-thick PDMS film, at room temperature. The initial mass content of the oil in the film is 50 %. *Solid line :* mass reduction, $(m_0\text{-}m)/m_0$. *Dashed line:* linear dimension reduction, $(l_0\text{-}l)/l_0$. Each point corresponds to a sample which was removed from the solvent bath, dried for several hours, then weighed and measured. (A) Extraction in chloroform bath. (B) Extraction in a 2-propanol bath.

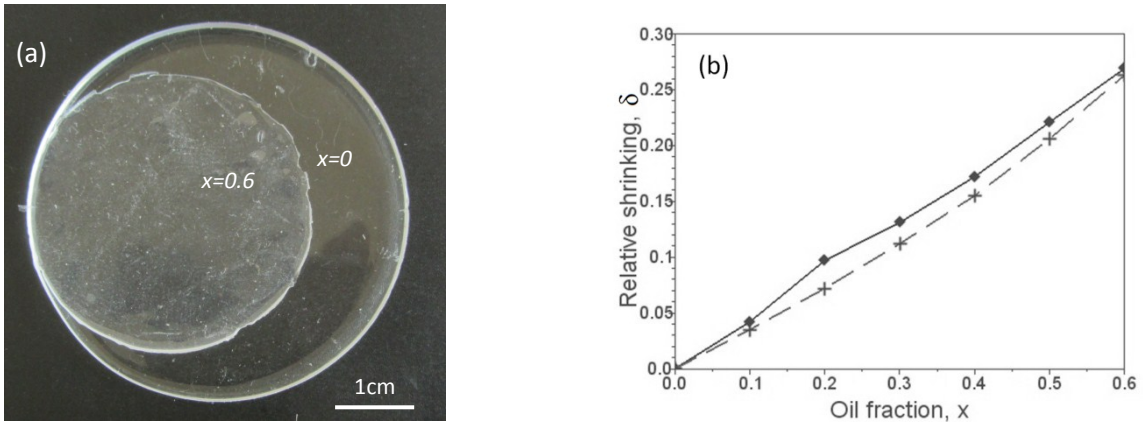

Fig.S2 Shrinking of PDMS film due to extraction of silicone oil. (a) The films with no oil (*x = 0*), and 60 % initial volume oil fraction (*x = 0.6*) after the oil extraction. Two PDMS films, prepared separately, are superimposed for illustrative purposes. (b) Relative shrinking of the linear dimensions of the films, $\delta=(d_0-d)/d_0$, after extraction of the silicone oil, for different initial fractions of the oil in the PDMS/oil mixture. The dashed line corresponds to the theoretical shrinkage,

$\delta_{theor} = 1-\left(V_{pdms}/(V_{pdms}+V_{oil})\right)^{\frac{1}{3}} = 1-(1-x)^{\frac{1}{3}}$. The oil fraction, *x*, is defined as $x = V_{oil}/(V_{pdms}+V_{oil})$

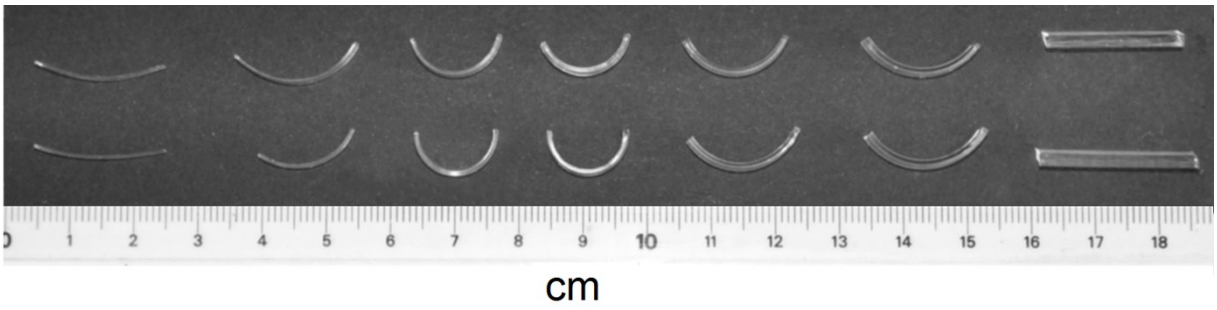

Figure S3. PDMS bilayer beams after oil extraction. The volume fraction of oil in the second layer before extraction is *x = 0.2*. The thickness of the first layer is 0.32 ± 0.01 mm. The thickness of the second layer grows from 0.11 mm to 1.25 mm (from left to right).

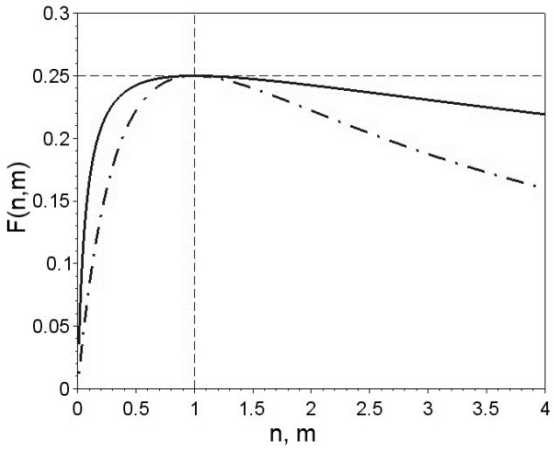

Figure S4 Behavior of the function $F(n,m)$ in the vicinity of the global extremum. Solid line: $F(n,1)$; dashed line: $F(1,m)$.

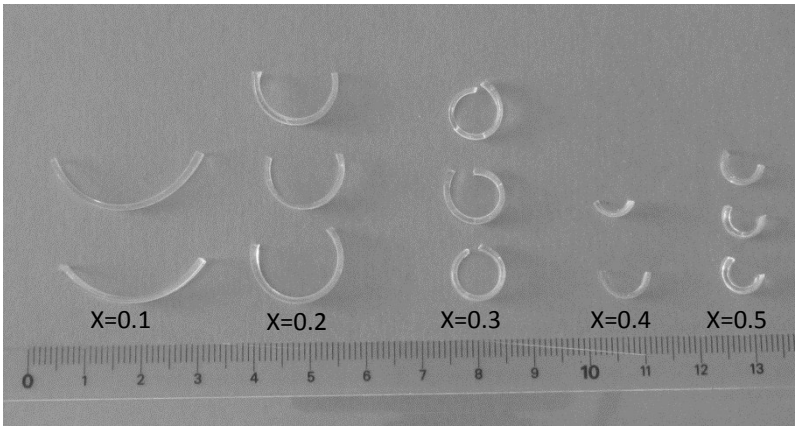

Fig.S5 PDMS bilayer beams, with approximately equal thickness of the layers, and varying oil fractions, *x*, in the top layer before extraction.

x	0.1	0.2	0.3	0.4	0.5
d	0.035	0.072	0.11	0.16	0.21
H , mm	0.79	0.74	0.923	0.769	0.94
d/H, mm^{-1}	0.044	0.096	0.121	0.204	0.220
R, mm	14.6	7.7	4.4	3.7	3.2
k, mm^{-1}	0.07	0.13	0.23	0.27	0.31

Table SI. The parameters of the beams shown in Figure S5.

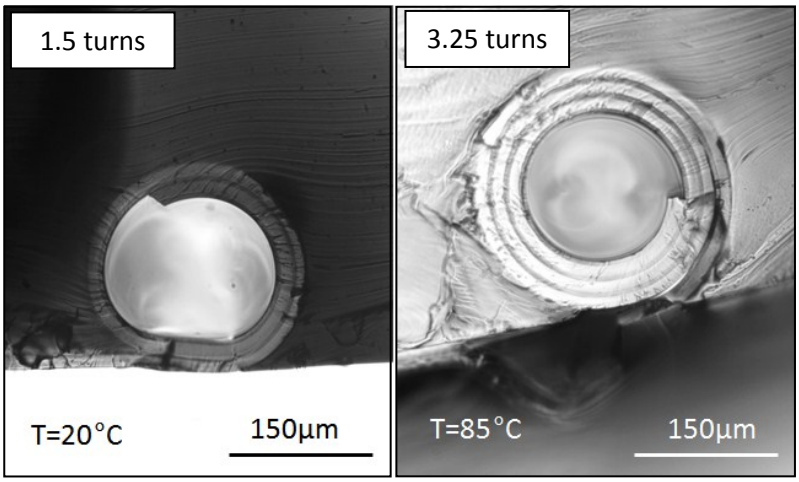

Fig.S6 Cross-sections of tubes formed at different water temperatures, for a fixed rolling time *t* = 1 min.

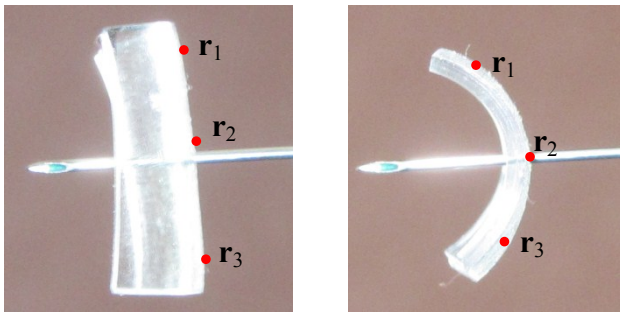

Fig.S7 Sample projections, corresponding to the minimal and the maximal curvatures. A radius of curvature, R, is found from the system of equations:

$$(\mathbf{r}_1-\mathbf{A})^2=(\mathbf{r}_2-\mathbf{A})^2=(\mathbf{r}_3-\mathbf{A})^2=R^2$$

(**A** is the center of the circumscribed circle).

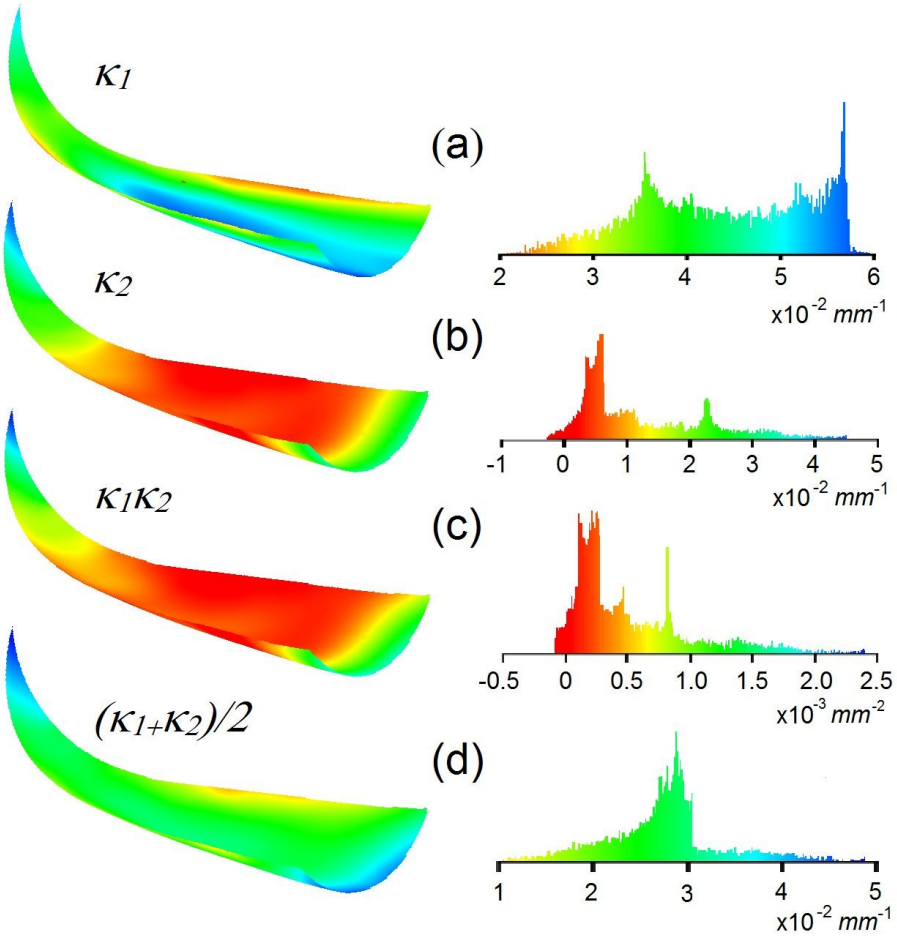

Fig.S8 Colouring of the 3D-scan of an isosceles triangle (OH = 100 mm, AB = 3 cm, see Fig.7) according to (a,b) the absolute values of the maximal (κ_1) and minimal (κ_2) curvatures, (c) Gaussian curvature, and (d) mean curvature.