Supplementary Material (ESI) for Journal of Materials Chemistry

Role of Surface Chemistry and Topology of Chemoselectively Tailored Embossed Films on Shear Adhesion

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Supplementary Material (ESI)

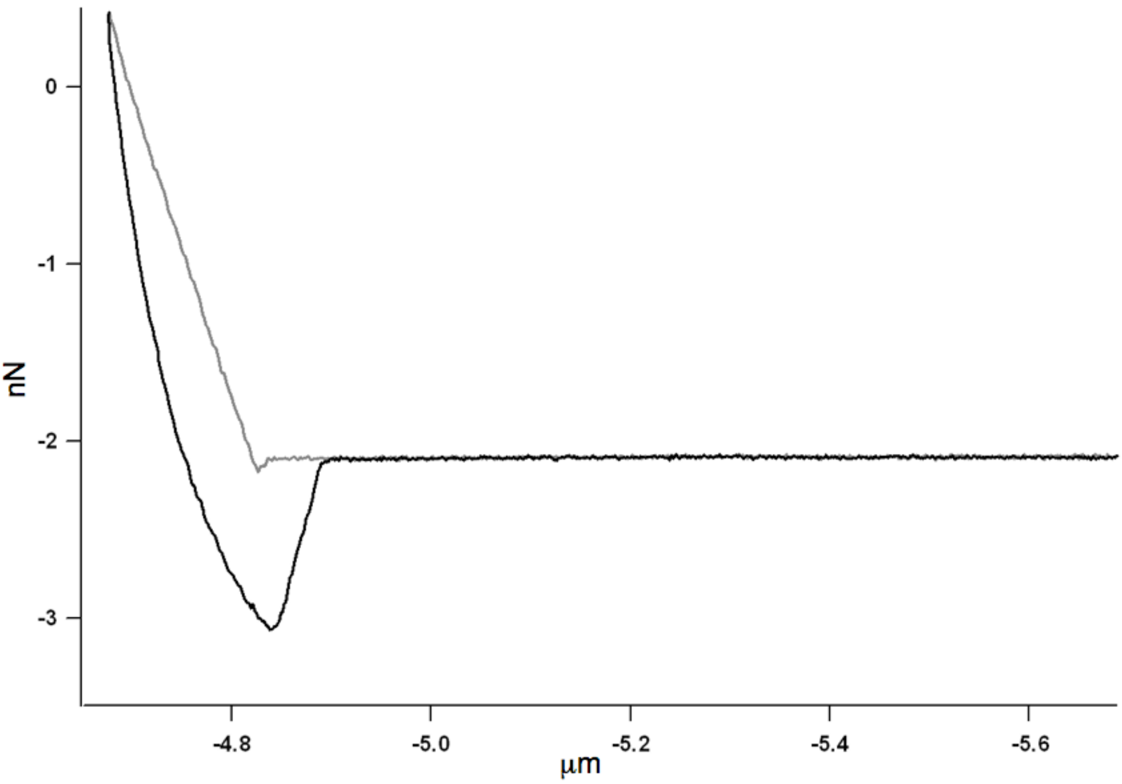

Figure S1. Nanoscale adhesion – force curve associated with the interactions between elastomer 1 and an alkane-functionalized AFM tip. The grey curve corresponds to the approach while the black curve represents the retraction.

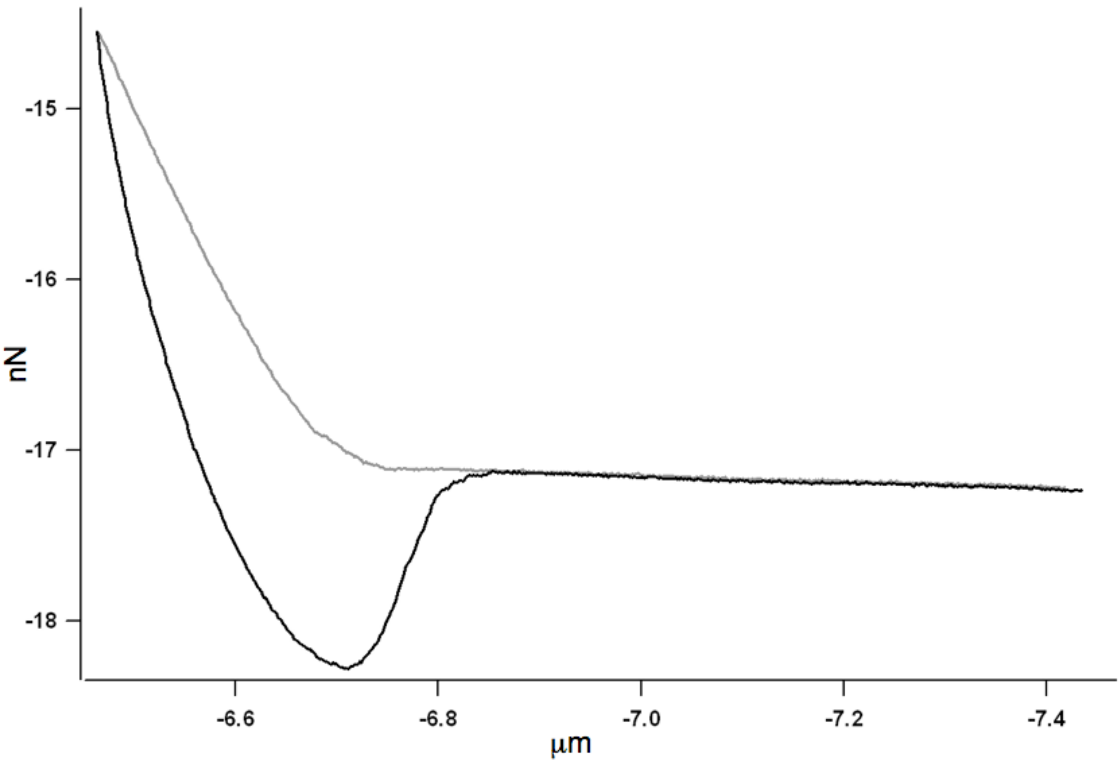

Figure S2. Nanoscale adhesion – force curve associated with the interactions between elastomer 1 and an oxyamine-functionalized AFM tip. The grey curve corresponds to the approach while the black curve represents the retraction.

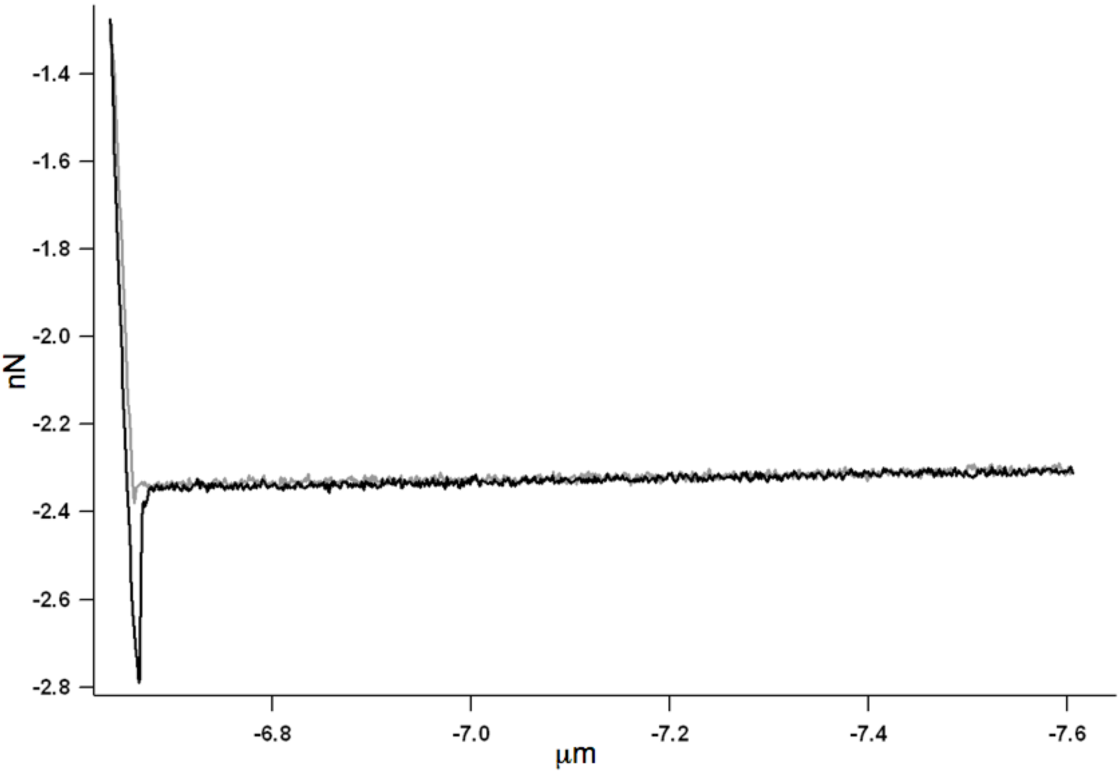

Figure S3. Nanoscale adhesion – force curve associated with the interactions between elastomer 2 and an alkane-functionalized AFM tip. The grey curve corresponds to the approach while the black curve represents the retraction.

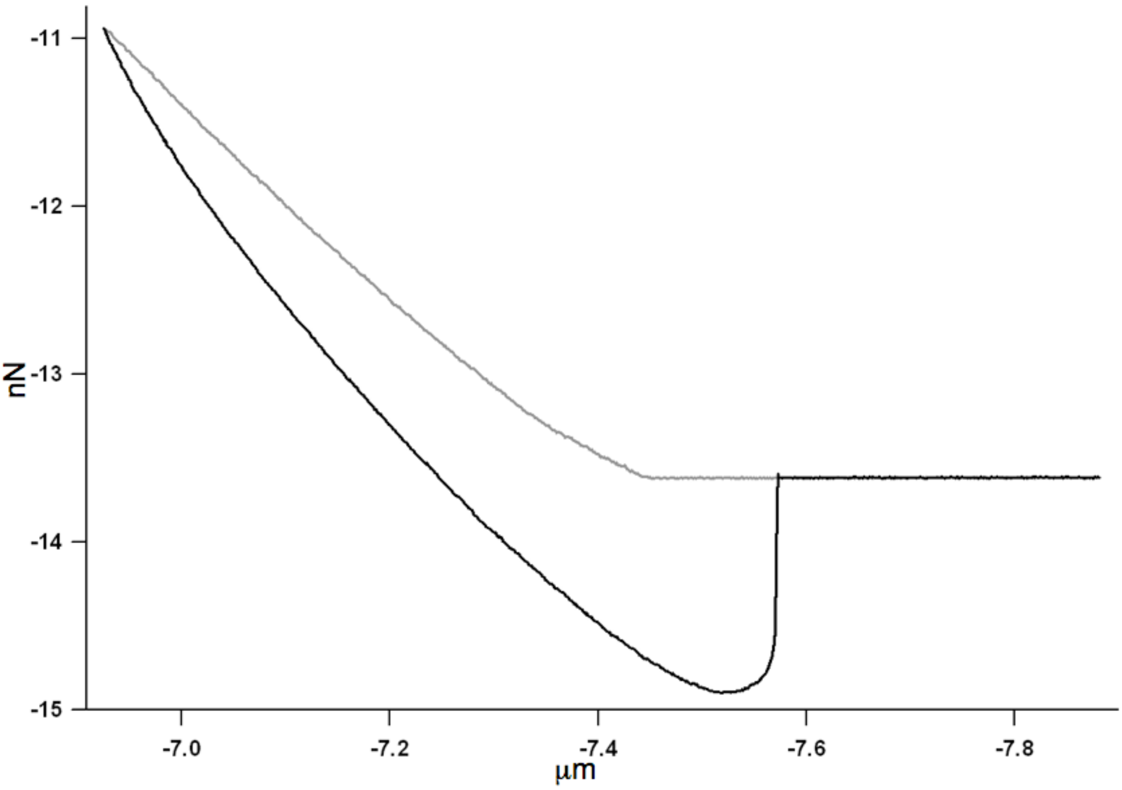

Figure S4. Nanoscale adhesion – force curve associated with the interactions between elastomer 2 and an oxyamine-functionalized AFM tip. The grey curve corresponds to the approach while the black curve represents the retraction.

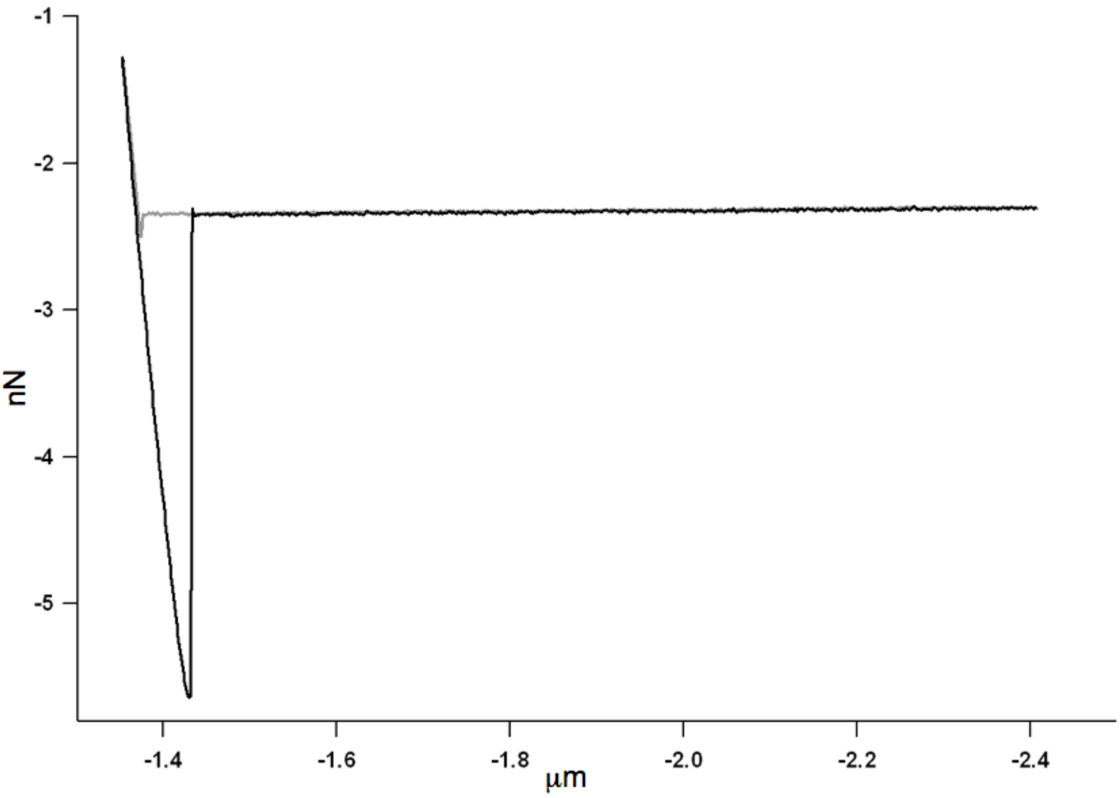

Figure S5. Nanoscale adhesion – force curve associated with the interactions between elastomer 3 and an alkane-functionalized AFM tip. The grey curve corresponds to the approach while the black curve represents the retraction.

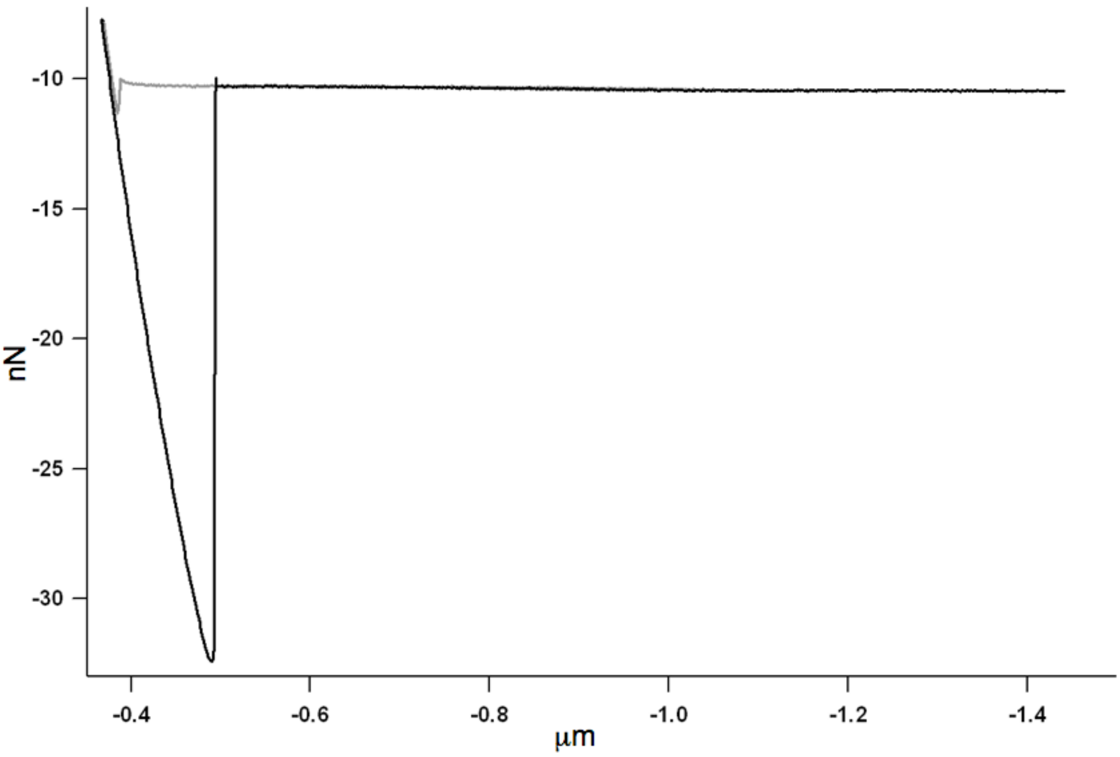

Figure S6. Nanoscale adhesion – force curve associated with the interactions between elastomer 3 and an oxyamine-functionalized AFM tip. The grey curve corresponds to the approach while the black curve represents the retraction.

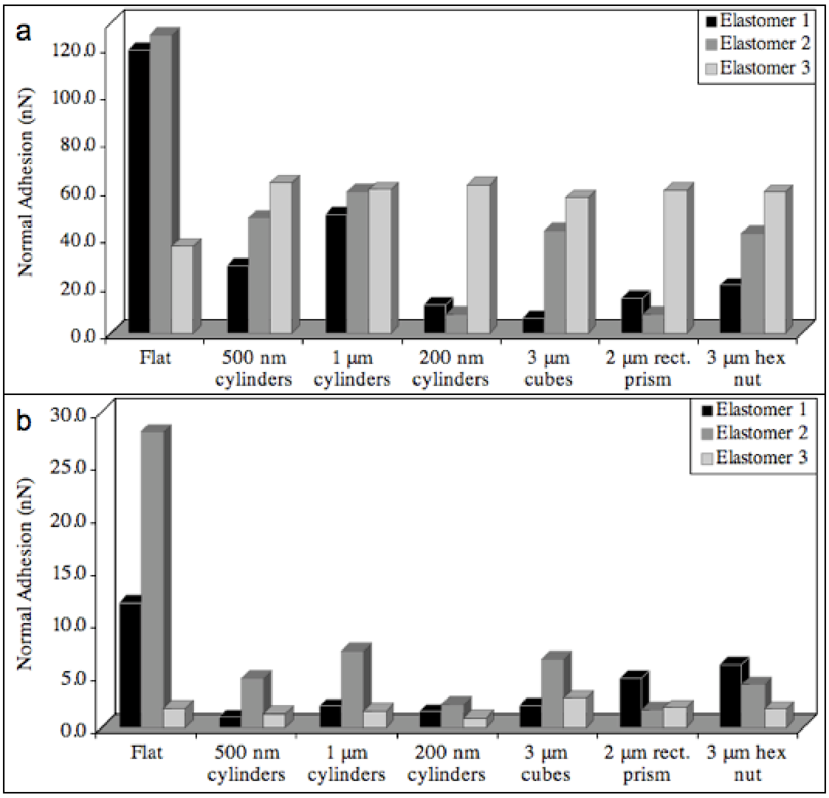

Figure S7. Normal adhesion as a function of surface topology and elastomer composition in (a) dry and (b) wet conditions.

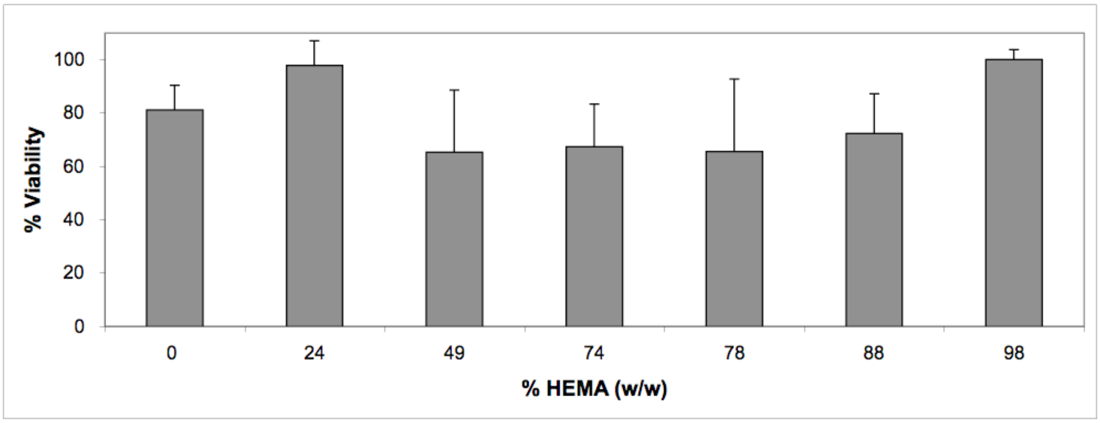

Figure S8. MTS assay depicting the viability of HeLa cells in the presence of elastomers with varying HEMA:MEA ratios. All elastomers are 1 % (w/w) PEGDA and 1 % (w/w) 2,2-diethoxyacetophenone. The remaining portion of the monomer solutions was composed of MEA.

Table S1. Mechanical Characteristics of Cross-Linked Films After Swelling in Water

HEMA Content (w/w)	MEA Content (w/w)	*E* (MPa)	σ (MPa)	ε (%)
0 %	98 %	0.15 ± 0.03	0.44 ± 0.13	514 ± 45
24 %	74 %	0.20 ± 0.11	0.49 ± 0.17	478 ± 37
49 %	49 %	0.16 ± 0.05	0.35 ± 0.07	425 ± 68
74 %	24 %	0.16 ± 0.09	0.25 ± 0.05	302 ± 29
78 %	20 %	0.15 ± 0.02	0.19 ± 0.04	279 ± 25
88 %	10 %	0.11 ± 0.01	0.28 ± 0.10	497 ± 57
98 %	0 %	0.12 ± 0.05	0.19 ± 0.06	371 ± 41

Table S2. Effect of Surface Composition and Topology on Contact Angle

Surface Topology	Contact Angle (°)		
	Elastomer 1	Elastomer 2	Elastomer 3
Flat	30.8 ± 1.3	60.8 ± 2.1	71.3 ± 2.3
1 μm x 1 μm x 1 μm Cylinders	105.5 ± 2.1	86.9 ± 1.7	106.8 ± 2.6
500 nm x 500 nm x 1 μm Cylinders	74.3 ± 2.2	81.4 ± 1.8	89.7 ± 0.9
200 nm x 200 nm x 200 nm Cylinders	109.1 ± 1.7	107.3 ± 2.3	95.7 ± 1.1
3 μm x 3 μm x 3 μm Rectangles	83.3 ± 1.4	90.5 ± 0.7	98.4 ± 1.6
2 μm x 2 μm x 6 μm Rectangles	83.4 ± 0.7	91.2 ± 1.0	100.3 ± 1.8
3 μm x 2.5 μm x 1 μm Hex Nuts	109.3 ± 3.0	76.5 ± 1.1	84.4 ± 2.3

Reference 3:

Mahdavi, A.; Ferreira, L.; Sundback, C.; Nichol, J. W.; Chan, E. P.; Carter, D. J. D.; Bettinger, C. J.; Patanavanich, S.; Chignozha, L.; Ben-Joseph, E.; Galakatos, A.; Pryor, H.; Pomerantseva, I.; Masiakos, P. T.; Faquin, W.; Zumbuehl, A.; Hong, S.; Borenstein, J.; Vacanti, J.; Langer, R.; Karp, J. M. *Proc. Natl. Acad. Sci. USA* **2008**, *105*, 2307-2312.