

Supporting Information

Touch Initiated On-Demand Adhesion on Rough Surfaces

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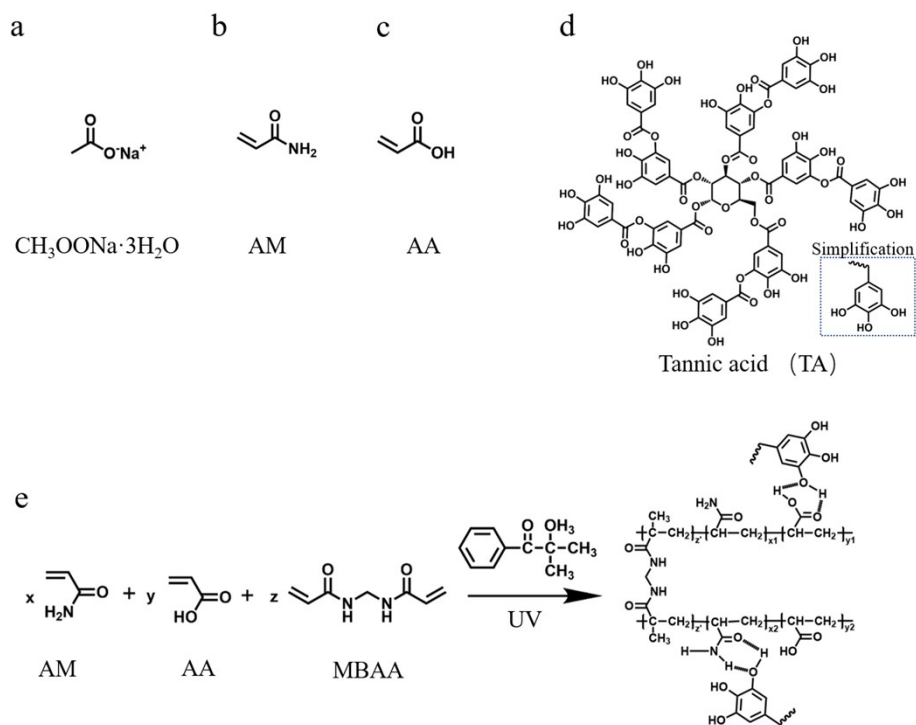


Figure S1. Formula of (a) NaAc, (b) AM, (c) AA and (d) TA. (e) The reaction mechanism of the hydrogel with AM and AA monomers.

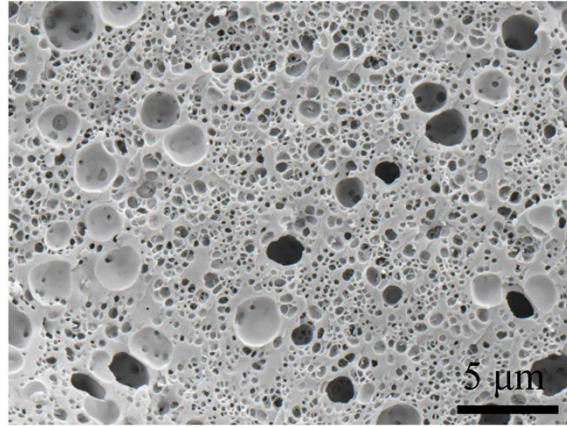


Figure S2. The microstructure of hydrogel without NaAc.

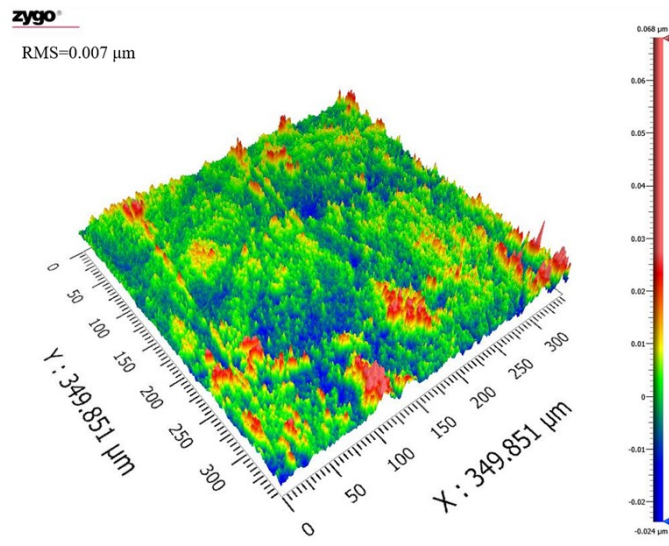


Figure S3. 3D profiler images of surfaces of the glass plates.

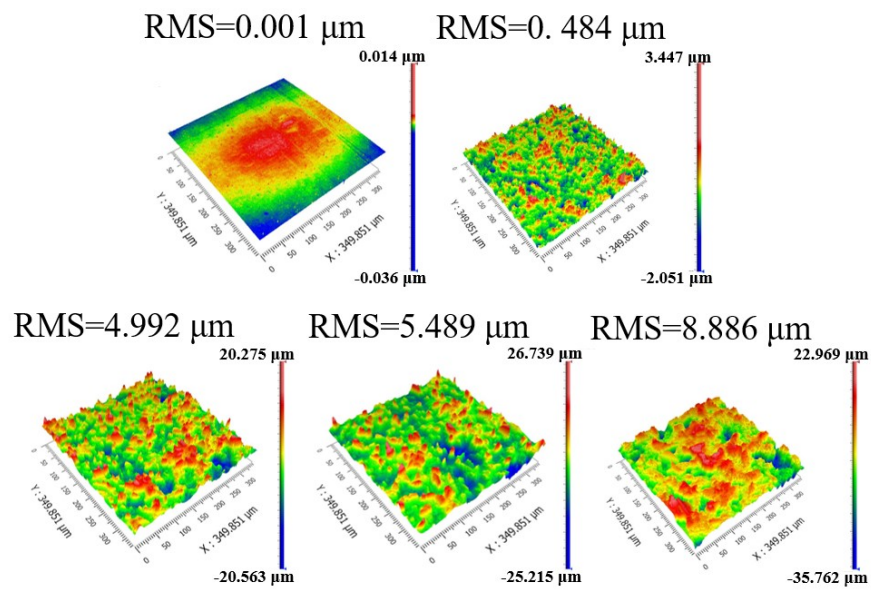


Figure S4. 3D morphology of surfaces with different root mean square roughness.

Table S1. Three adhesion performance tests of TIA on surfaces with different roughness.

RMS roughness (μm)	Sample 1# Strength (kPa)	Sample 2# Strength (kPa)	Sample 3# Strength (kPa)	Average Strength (kPa)	Stdev
0.001	454.61	554.56	387.52	465.56	84.05
0.484	519.99	397.97	410.66	442.87	67.08
4.992	333.33	360.93	299.57	331.28	30.73
5.489	280.80	334.29	280.74	298.61	30.89
8.886	134.30	118.05	102	118.12	16.15

Table S2. The mass and size of the objects being adhered.

Material	Mass (g)	Dimension (mm)
Metal	14.28	65.16 x 114.54
Glass	13.30	39.94 x 26.41
Ceramic	7.93	52.66 x 20.11 x 6.38
Teflon	42.74	65.28 x 49.52
PC	31.39	58.02 x 42.97 x 21.08
Rubber	64.55	13.94 x 39.92
Cork	59.04	95.73 x 30.99
Paper	4.83	80.57 x 64.78 x 24.16

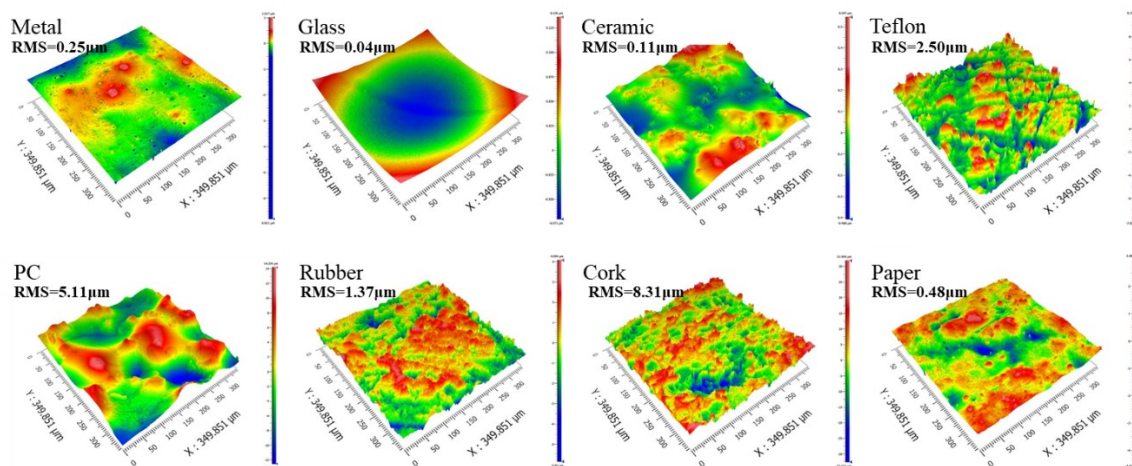


Figure S5. 3D profiler images of surfaces of different adhered objects.

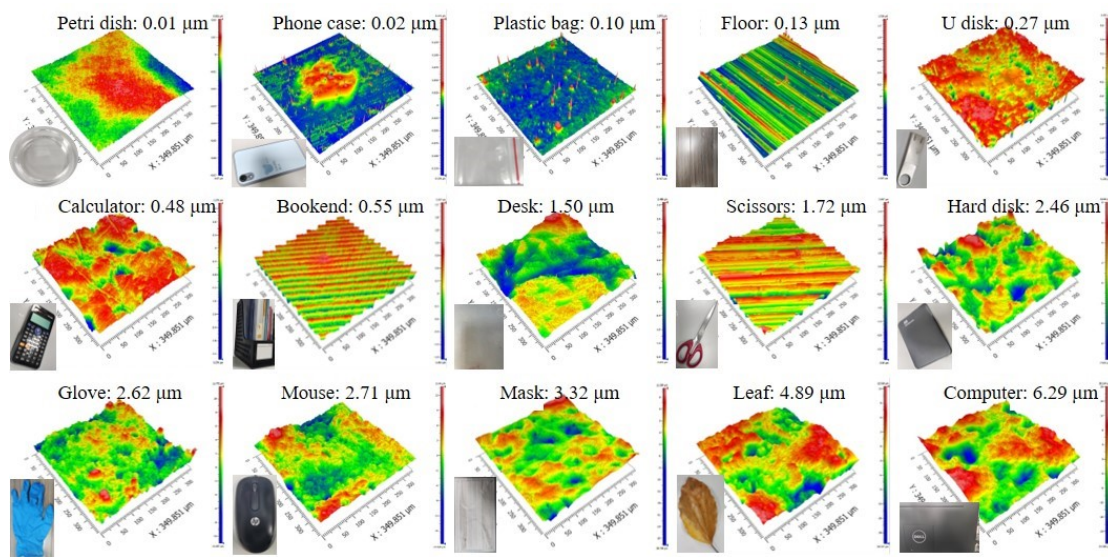


Figure S6. Surface roughness of some objects in office.

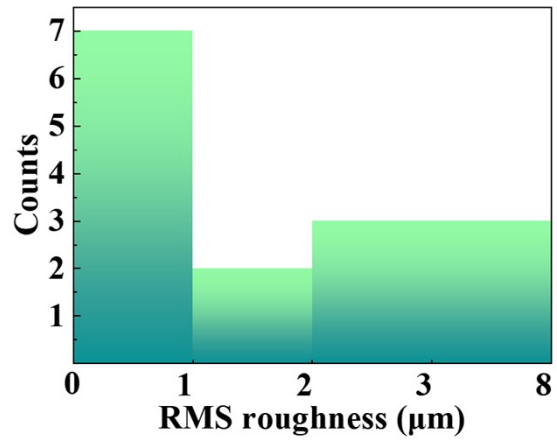


Figure S7. Roughness statistics of different objects in office.

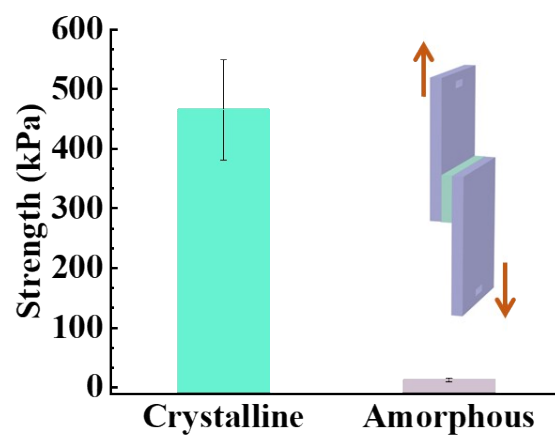


Figure S8. Adhesion strength of TIA in amorphous and crystalline states. Inset is the schematic diagram of adhesion test.

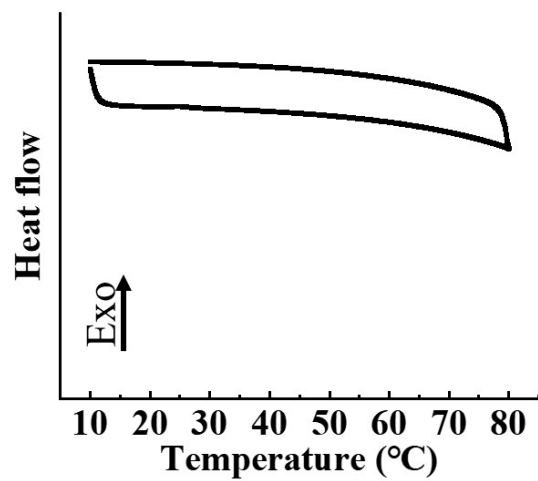


Figure S9. DSC curve of hydrogel without NaAc.

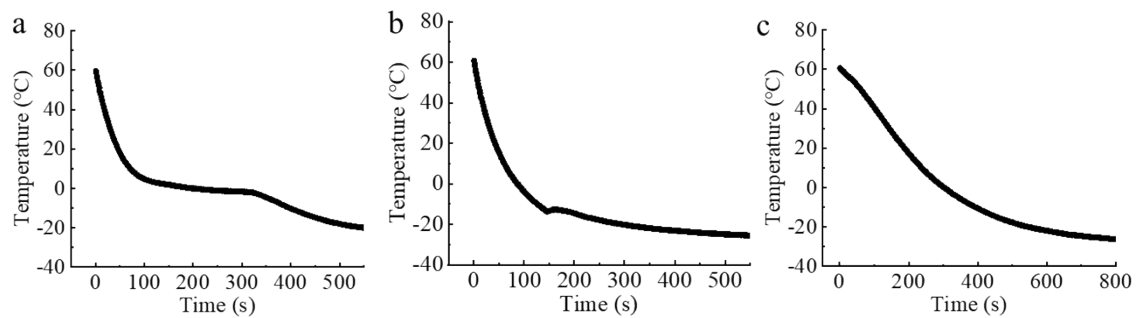


Figure S10. The cooling curve of the (a) water, (b) unsaturated NaAc solution and (c) supersaturated NaAc solution.

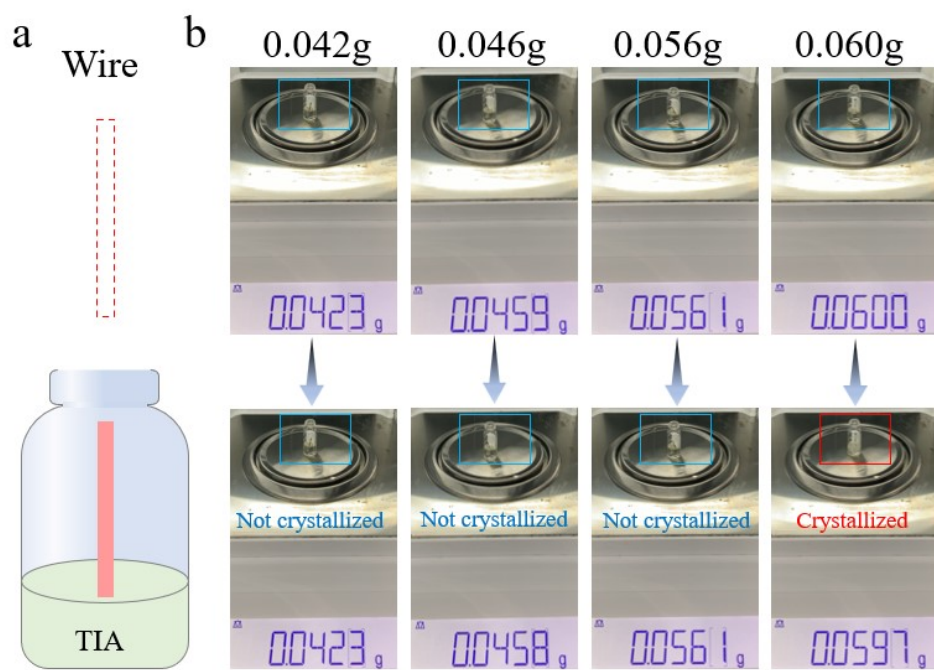


Figure S11. (a) Schematic diagram of a metal wire impacting on TIA. (b) Snapshots of TIA under impact of metal wires with different weights.

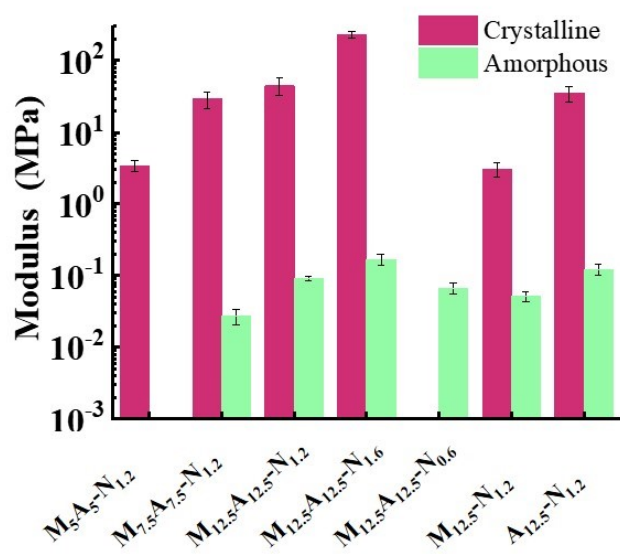


Figure S12. Moduli of hydrogels with different compositions