

SUPPORTING INFORMATION

Switching Off the Tackiness of a Nanocomposite Adhesive in Thirty Seconds via Infrared Sintering

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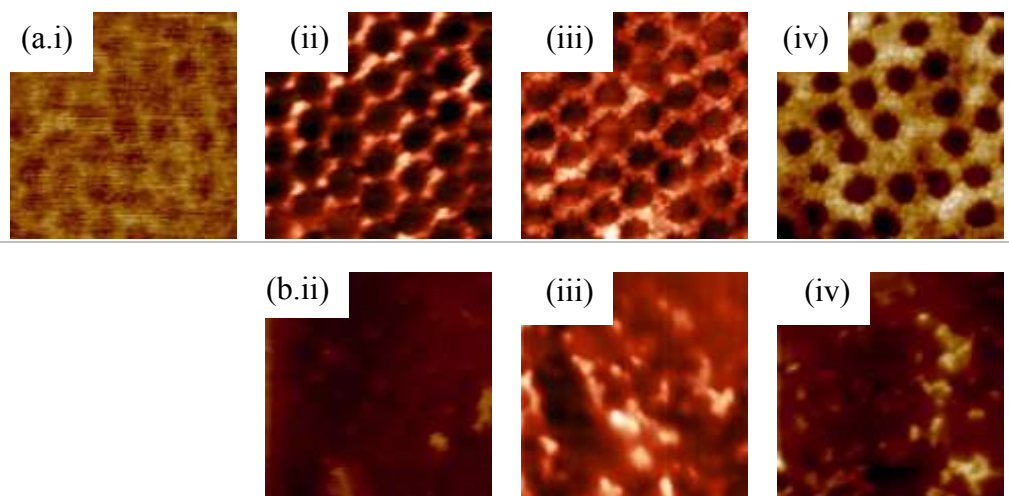


Figure S1. (a) Surface and (b) cross-sectional AFM height images of P1 *before* sintering with (i) 0 vol. % NPs, (ii) 7.0 vol. % NPs, (iii) 11.6 vol. % NPs, (iv) 16.4 vol. % NPs. The softer PSA phase appears darker, and the hard nanoparticles appear brighter in the images. All images are $1.5 \mu\text{m} \times 1.5 \mu\text{m}$.

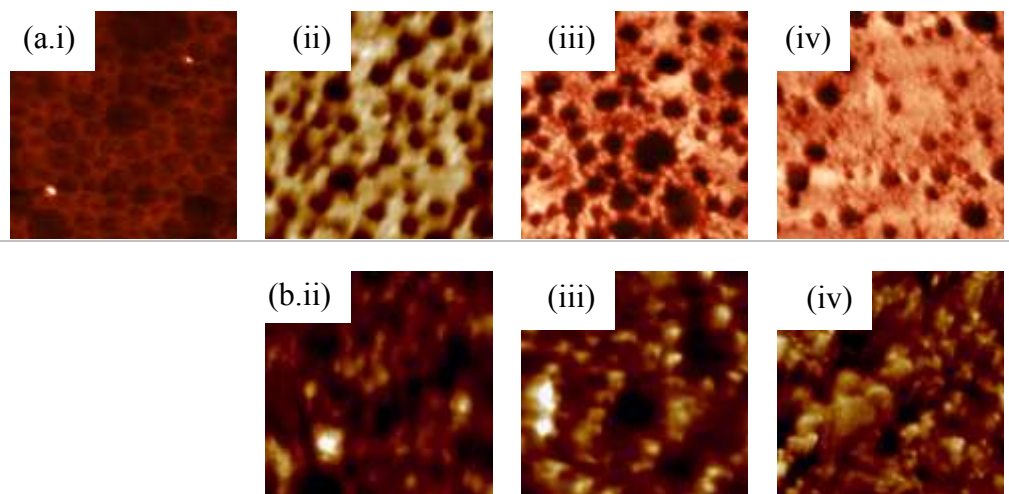


Figure S2. (a) Surface and (b) cross-sectional AFM phase images of P2 *before* sintering with (i) 0 vol. % NPs, (ii) 9.3 vol. % NPs, (iii) 14.0 vol. % NPs, (iv) 18.7 vol. % NPs. The softer PSA phase appears darker, and the hard nanoparticles appear brighter in the images. All images are $1.5 \mu\text{m} \times 1.5 \mu\text{m}$.

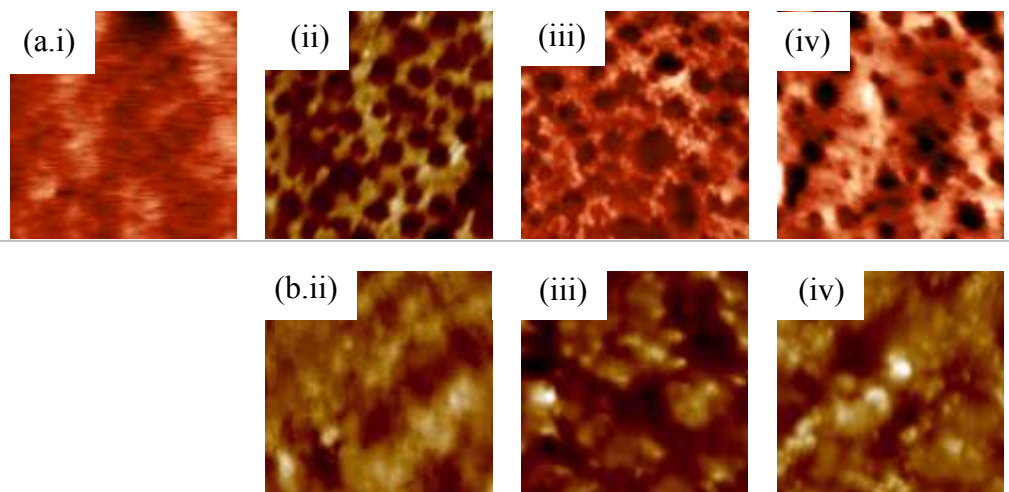


Figure S3. (a) Surface and (b) cross-sectional AFM phase images of P2 *before* sintering with (i) 0 vol. % NPs, (ii) 9.3 vol. % NPs, (iii) 14.0 vol. % NPs, (iv) 18.7 vol. % NPs. The softer PSA phase appears darker, and the hard nanoparticles appear brighter in the images. All images are 1.5 μm x 1.5 μm .

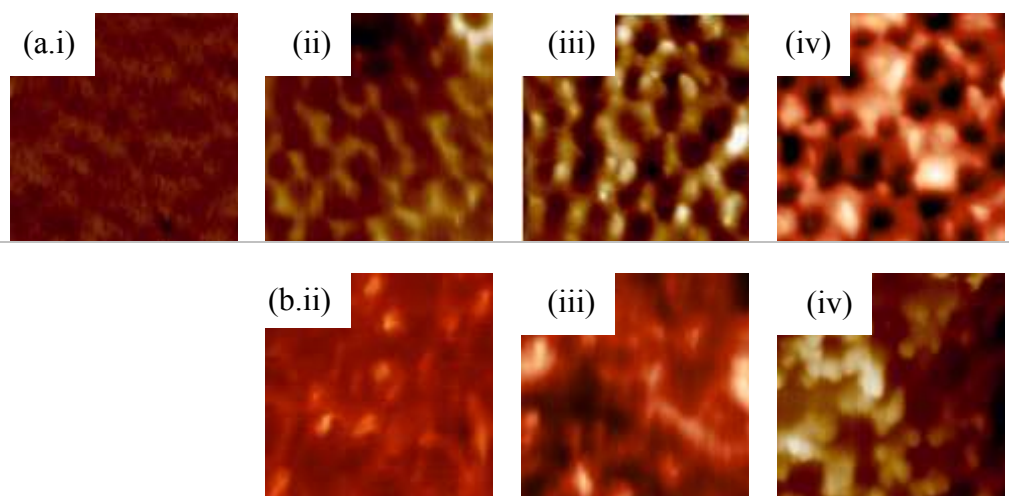


Figure S4. (a) Surface and (b) cross-sectional AFM height images of P1 *after* sintering with (i) 0 vol. % NPs, (ii) 7.0 vol. % NPs, (iii) 11.6 vol. % NPs, (iv) 16.4 vol. % NPs. The softer PSA phase appears darker, and the hard nanoparticles appear brighter in the images. All images are 1.5 μm x 1.5 μm .

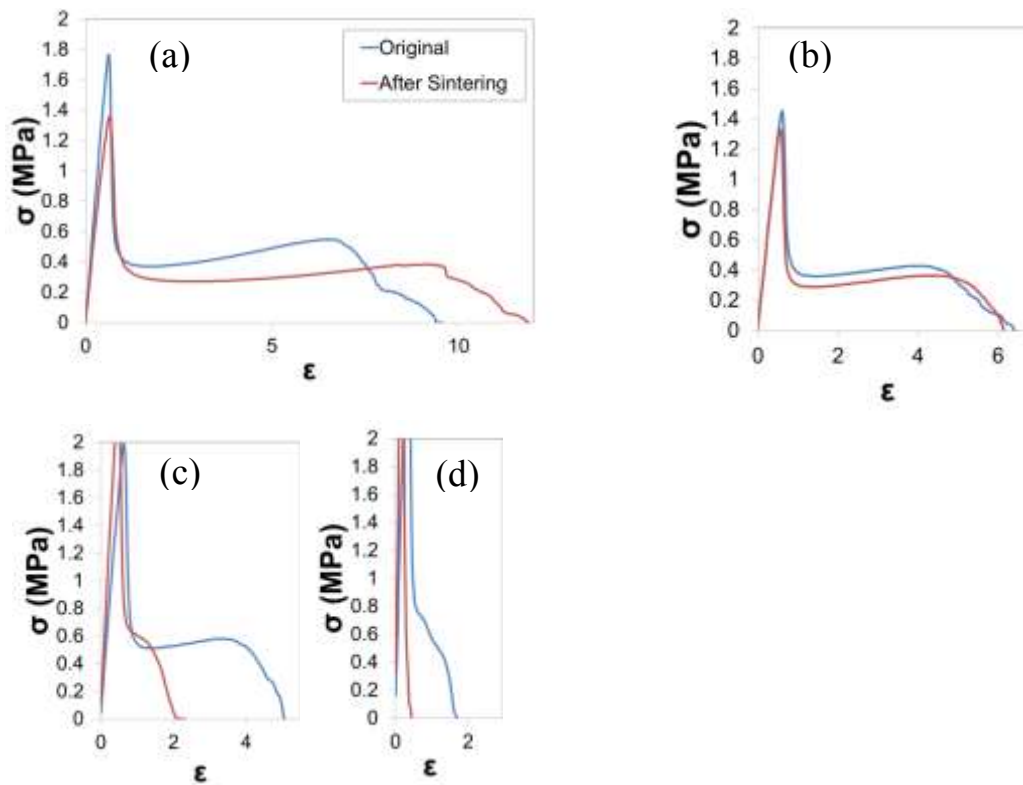


Figure S5. Representative probe-tack curves showing the effect of sintering on P1 adhesives with (a) 0 vol.%, (b) 7.0 vol. %, (c) 11.6 vol.% and (d) 16.0 vol.% NPs. The original result (blue line) is compared to the result after sintering (red line).

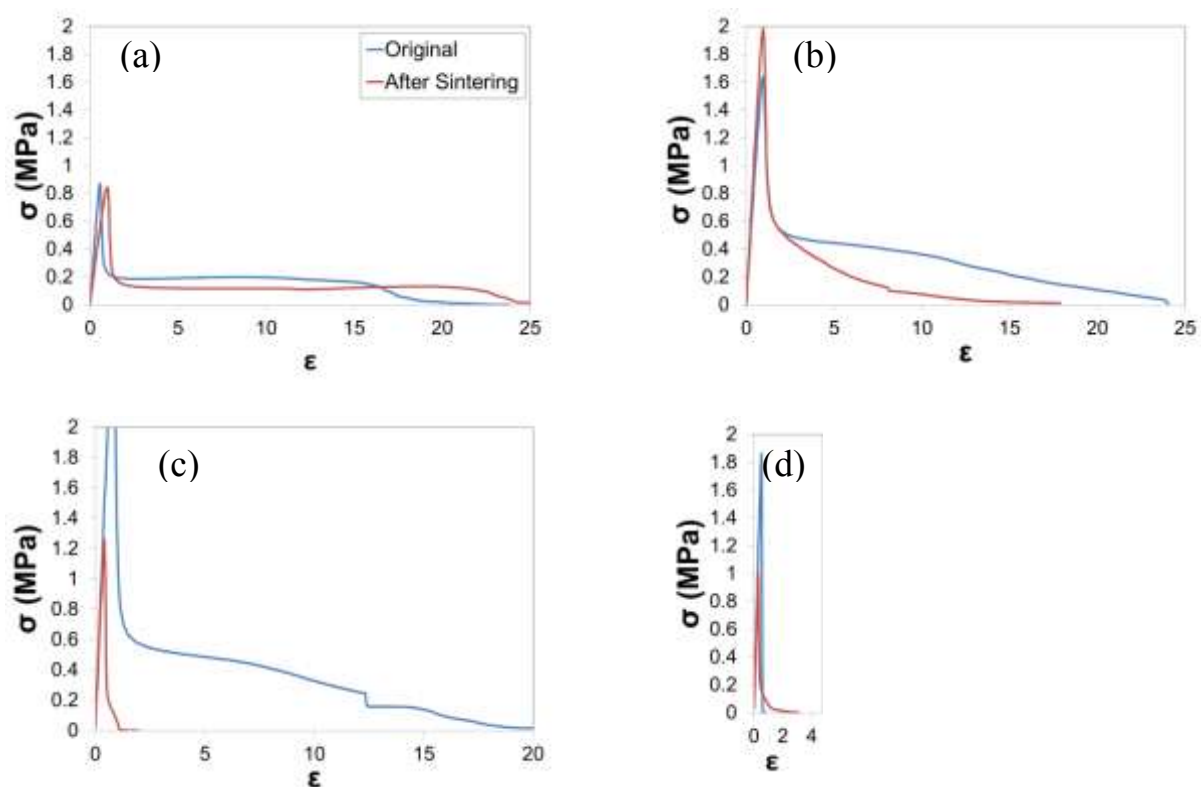


Figure S6. Representative probe-tack curves showing the effect of sintering on P2 adhesives with (a) 0 vol.%, (b) 7.0 vol. %, (c) 16.0 vol.% and (d) 18.7 vol.% NPs. The original result (blue line) is compared to the result after sintering (red line).

Table S1. Peel Test Results for P1 Adhesives with Varying Concentrations of NPs

NP content (Vol. %)	P1 (<i>Initial</i>)			P1 (<i>Sintered</i>)		
	Peel Force (avg.) (N/25mm)	F_{\min} (N/25 mm)	F_{\max} (N/25 mm)	Peel Force (avg.) (N/25mm)	F_{\min} (N/25 mm)	F_{\max} (N/25 mm)
0	7.61	6.84	8.2	10.385	9.435	11.315
11.6	7.08	6.12	7.75	4.32	3.605	6.45
14.0	7.88	7.05	8.64	0.825	0.525	1.45
18.7	1.47	0.1	3.71	0.055	0.04	0.065

Table S2. Loop Tack Results for P1 Adhesives with Varying Concentrations of NPs

	P1 (<i>Initial</i>)	P1 (<i>Sintered</i>)
NP content (Vol. %)	Loop Tack Force (max.) (N/25mm)	Loop Tack Force (max.) (N/25mm)
0	12.65	11.85
11.6	11.80	2.33
14.0	5.33	0.67
18.7	0.60	0.10

Video S1. Video of 5 mm polymer beads poured onto optimized nanocomposite PSAs before (on left) and after (on right) sintering. The beads are poured from a height of approximately 5cm.

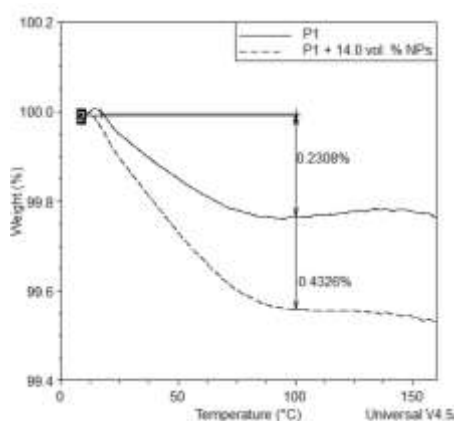


Figure S7. TGA thermogram showing percentage weight loss of pure P1 and P1 with 14.0 vol. % NPs when heated between 25 and 150 °C in air, at a heating rate of 10 °C per minute.