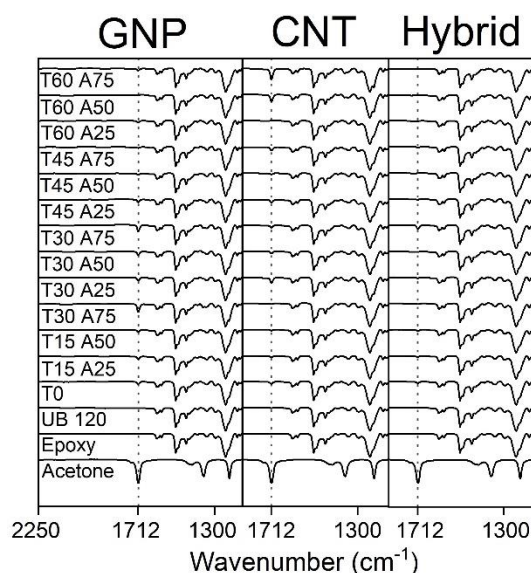


# Supplementary Material

**Figure S1.** FTIR spectra for all samples. Dashed lines at 1712 cm<sup>-1</sup> highlight the characteristic ketone band.



**Table S1.** Total acoustic energy delivered during sonication and results for each property tested. Processing parameters are denoted in samples' names: minutes of processing time after letter "T", and amplitude (%) after letter "A". "UB" stands for ultrasonic bath.

Sample	Acoustic energy (J)	$\sigma_{AC}$ (S·m <sup>-1</sup> )	E' at 40 °C (MPa)	T <sub>g</sub> (°C)
Neat epoxy	0	$(4.5 \pm 2.9) \times 10^{-12}$	$1631.4 \pm 91.8$	$138.1 \pm 0.1$
GNP 2.5% T0	0	$(2.1 \pm 0.5) \times 10^{-10}$	$2648.7 \pm 150.9$	$124.6 \pm 1.8$
GNP 2.5% T120 UB	3828	$(5.6 \pm 4.5) \times 10^{-7}$	$2761.8 \pm 69.4$	$134.1 \pm 0.9$
GNP 2.5% T15 A25	5700	$(6.8 \pm 1.5) \times 10^{-10}$	$2558.8 \pm 50.0$	$126.4 \pm 0.91$
GNP 2.5% T30 A25	12420	$(5.8 \pm 1.3) \times 10^{-11}$	$2603.1 \pm 320.6$	$135.6 \pm 0.13$
GNP 2.5% T45 A25	18500	$(5.9 \pm 4.4) \times 10^{-10}$	$2731.8 \pm 278.5$	$130.0 \pm 0.3$
GNP 2.5% T60 A25	25025	$(2.9 \pm 2.2) \times 10^{-10}$	$2709.8 \pm 90.3$	$139.0 \pm 1.3$
GNP 2.5% T15 A50	21450	$(7.0 \pm 2.3) \times 10^{-11}$	$2782.6 \pm 95.8$	$128.2 \pm 0.4$
GNP 2.5% T30 A50	43460	$(3.6 \pm 0.9) \times 10^{-11}$	$2751.1 \pm 186.9$	$123.2 \pm 2.1$
GNP 2.5% T45 A50	64530	$(3.8 \pm 1.4) \times 10^{-11}$	$2909.0 \pm 48.2$	$126.5 \pm 0.8$
GNP 2.5% T60 A50	87170	$(1.7 \pm 0.7) \times 10^{-11}$	$2849.2 \pm 12.2$	$131.3 \pm 0.4$
GNP 2.5% T15 A75	48100	$(7.6 \pm 1.2) \times 10^{-11}$	$2693.9 \pm 301.2$	$105.8 \pm 2.5$
GNP 2.5% T30 A75	90980	$(4.8 \pm 0.7) \times 10^{-11}$	$2324.2 \pm 233.2$	$116.2 \pm 1.6$
GNP 2.5% T45 A75	132700	$(2.4 \pm 0.2) \times 10^{-11}$	$2715.7 \pm 106.5$	$133.7 \pm 0.1$
GNP 2.5% T60 A75	171000	$(2.0 \pm 0.3) \times 10^{-11}$	$2654.3 \pm 153.3$	$133.3 \pm 2.2$
CNT 0.25% T0	0	$(1.1 \pm 0.9) \times 10^{-4}$	$2554.8 \pm 133.1$	$132.1 \pm 0$

CNT 0.25% 120 UB	3828	$(1.6 \pm 1.3) \times 10^{-5}$	$2346.6 \pm 81.7$	$133.4 \pm 0.9$
CNT 0.25% T15 A25	5700	$(1.3 \pm 0.1) \times 10^{-3}$	$2248.8 \pm 5.9$	$128.8 \pm 1.4$
CNT 0.25% T30 A25	12420	$(1.1 \pm 0.1) \times 10^{-3}$	$2387.0 \pm 15.7$	$131.7 \pm 0.7$
CNT 0.25% T45 A25	18500	$(1.4 \pm 0.1) \times 10^{-3}$	$2230.8 \pm 52.3$	$114.7 \pm 0.3$
CNT 0.25% T60 A25	25025	$(1.4 \pm 0.2) \times 10^{-3}$	$2457.6 \pm 40.7$	$128.3 \pm 0.3$
CNT 0.25% T15 A50	21450	$(6.5 \pm 0.4) \times 10^{-4}$	$2241.4 \pm 74.1$	$132.0 \pm 0.8$
CNT 0.25% T30 A50	43460	$(2.3 \pm 0.4) \times 10^{-4}$	$2167.1 \pm 91.0$	$110.2 \pm 1.2$
CNT 0.25% T45 A50	64530	$(1.5 \pm 0.1) \times 10^{-4}$	$1770.7 \pm 25.98$	$100.1 \pm 0.9$
CNT 0.25% T60 A50	87170	$(1.2 \pm 0.2) \times 10^{-4}$	$1878.2 \pm 85.7$	$82.9 \pm 0.5$
CNT 0.25% T15 A75	48100	$(1.6 \pm 0.6) \times 10^{-3}$	$2386.6 \pm 82.0$	$122.8 \pm 0.5$
CNT 0.25% T30 A75	90980	$(5.2 \pm 1.4) \times 10^{-4}$	$2348.2 \pm 22.4$	$121.3 \pm 0.8$
CNT 0.25% T45 A75	132700	$(3.8 \pm 0.6) \times 10^{-4}$	$2292.2 \pm 5.7$	$116.7 \pm 1.8$
CNT 0.25% T60 A75	171000	$(3.3 \pm 0.4) \times 10^{-4}$	$2287.3 \pm 112.6$	$112.5 \pm 0.3$
HB 2.5/0.25% T0	0	$(4.2 \pm 3.6) \times 10^{-5}$	$2931.4 \pm 170.2$	$133.5 \pm 1.0$
HB 2.5/0.25% T120 UB	3828	$(6.7 \pm 3.1) \times 10^{-4}$	$2660.2 \pm 353.4$	$136.1 \pm 2.8$
HB 2.5/0.25% T15 A25	5700	$(1.3 \pm 1.2) \times 10^{-3}$	$2672.3 \pm 165.8$	$137.5 \pm 1.3$
HB 2.5/0.25% T30 A25	12420	$(5.9 \pm 2.3) \times 10^{-5}$	$2719.3 \pm 487.7$	$134.8 \pm 0.4$
HB 2.5/0.25% T45 A25	18500	$(1.3 \pm 0.8) \times 10^{-3}$	$2659.1 \pm 13.7$	$135.9 \pm 1.2$
HB 2.5/0.25% T60 A25	25025	$(4.6 \pm 2.5) \times 10^{-4}$	$2994.5 \pm 3.6$	$137.9 \pm 0.5$
HB 2.5/0.25% T15 A50	21450	$(5.7 \pm 0.2) \times 10^{-6}$	$2589.7 \pm 223.8$	$133.4 \pm 0.7$
HB 2.5/0.25% T30 A50	43460	$(3.2 \pm 0.2) \times 10^{-5}$	$2749.9 \pm 23.9$	$135.1 \pm 0.3$
HB 2.5/0.25% T45 A50	64530	$(9.9 \pm 7.0) \times 10^{-6}$	$2839 \pm 180.7$	$138.4 \pm 0.0$
HB 2.5/0.25% T60 A50	87170	$(6.0 \pm 0.6) \times 10^{-6}$	$2817.5 \pm 1.8$	$140.3 \pm 1.1$
HB 2.5/0.25% T15 A75	48100	$(1.3 \pm 0.3) \times 10^{-5}$	$2850.7 \pm 60.6$	$132.6 \pm 0.9$
HB 2.5/0.25% T30 A75	90980	$(1.2 \pm 0.9) \times 10^{-5}$	$2492.5 \pm 246.5$	$119.7 \pm 1.0$
HB 2.5/0.25% T45 A75	132700	$(7.3 \pm 2.7) \times 10^{-6}$	$2707.1 \pm 79.7$	$134.3 \pm 1.4$
HB 2.5/0.25% T60 A75	171000	$(8.9 \pm 4.2) \times 10^{-6}$	$2824.0 \pm 12.0$	$136.4 \pm 0.5$