Designing Block Copolymer Architectures toward Tough Bioplastics from Natural Rosin

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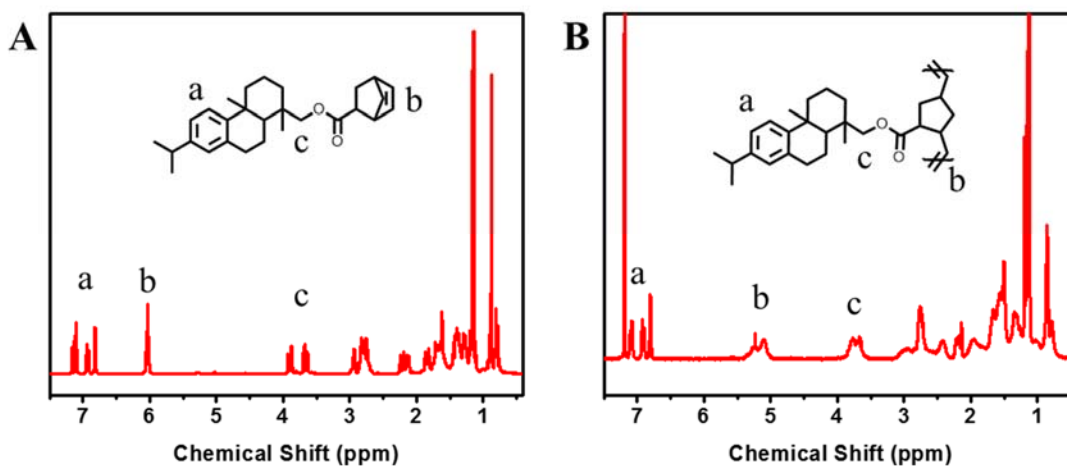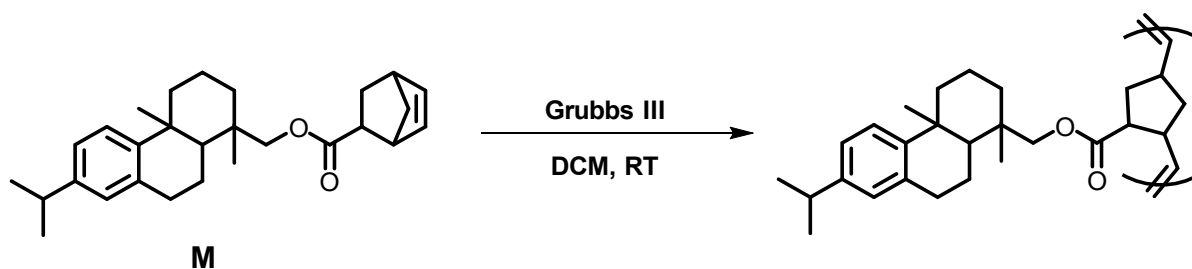# Supporting Information

Scheme S1. Synthesis of homopolymer by ROMP.

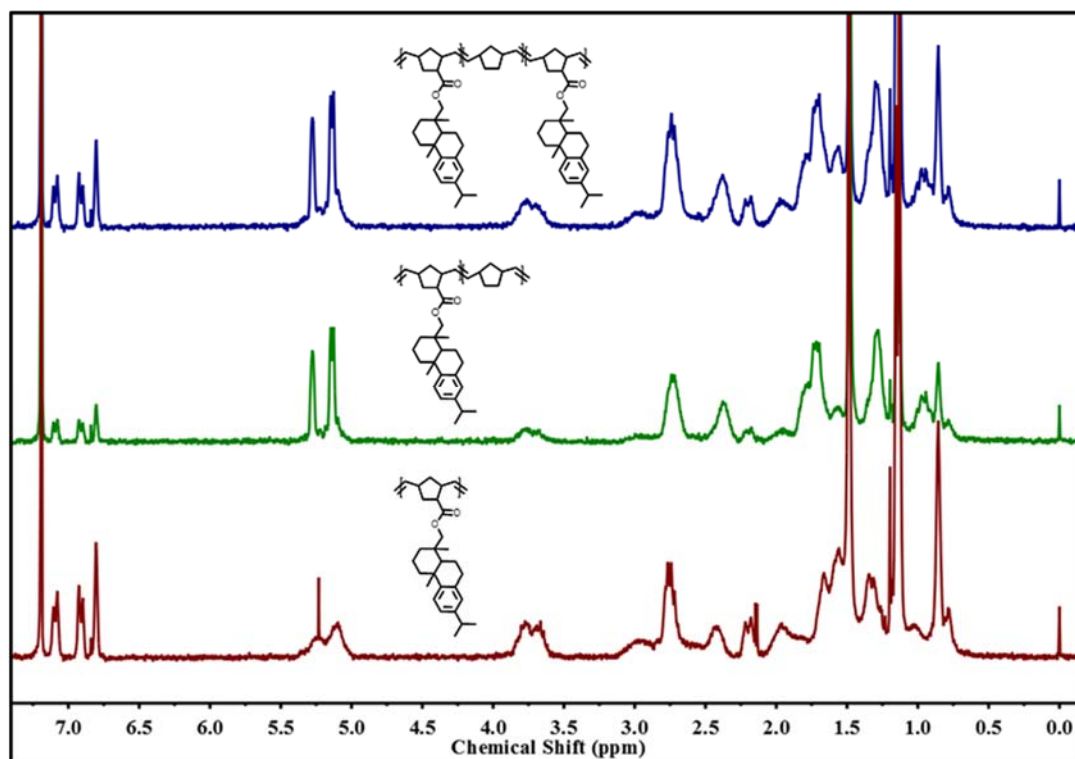**Figure S1**. ^{1}H NMR spectra of (A) Monomer (**M**); (B) Homopolymer.

Figure S2. ^{1}H NMR spectra of polymers from each step in synthesis of triblock copolymers.
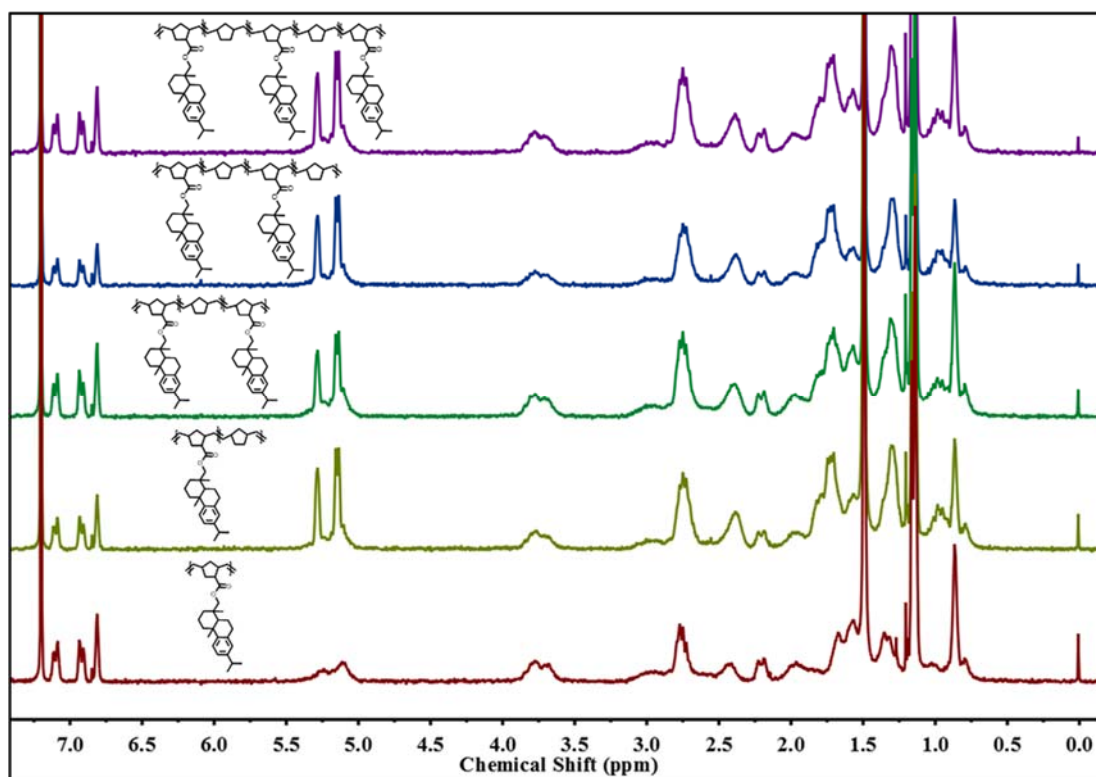

Figure S3. ^{1}H NMR spectra of polymers from each step in synthesis of pentablock copolymers.
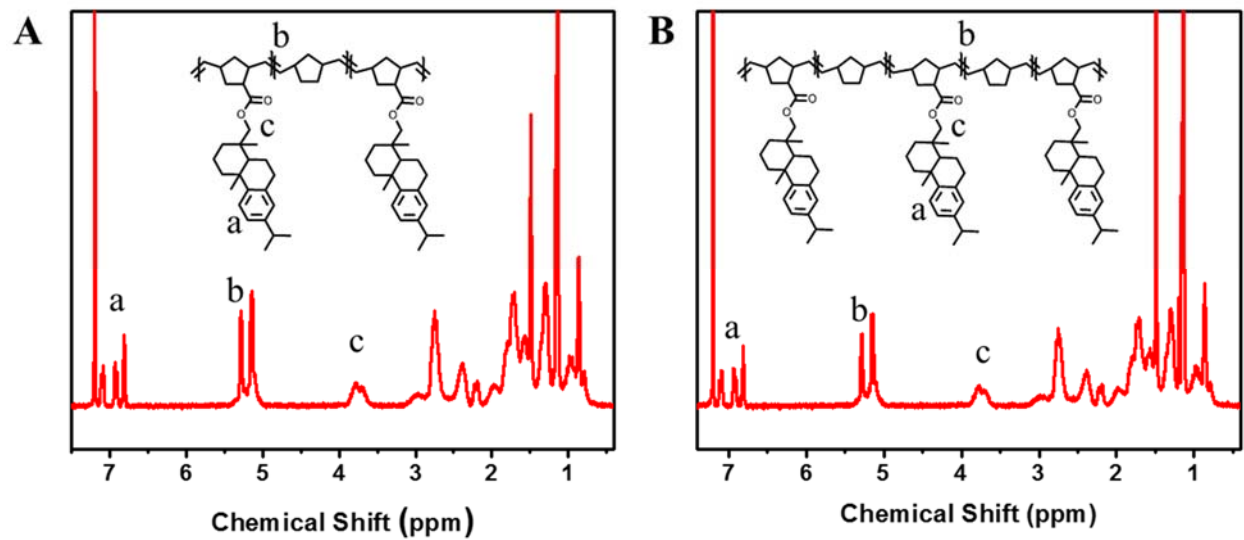
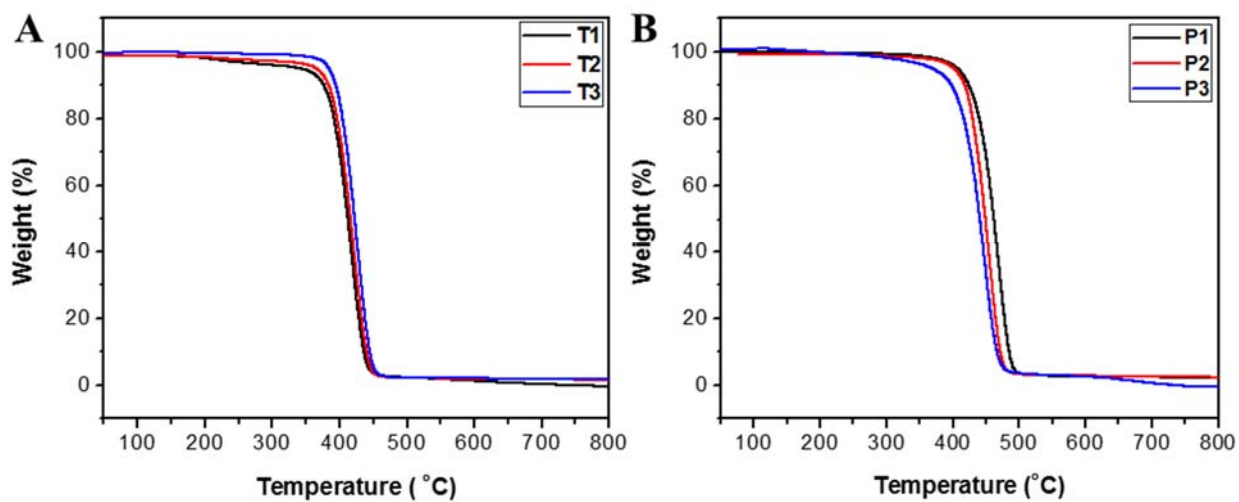**Figure S4**. ^{1}H NMR spectra of (A) Triblock copolymer; (B) Pentablock copolymers.

Figure S5. TGA curves of (A) Triblock copolymers **T1**, **T2**, and **T3**; and (B) Pentablock copolymers **P1**, **P2**, and **P3**.

Table S1. SAXS results of all tri and pentablock copolymers.

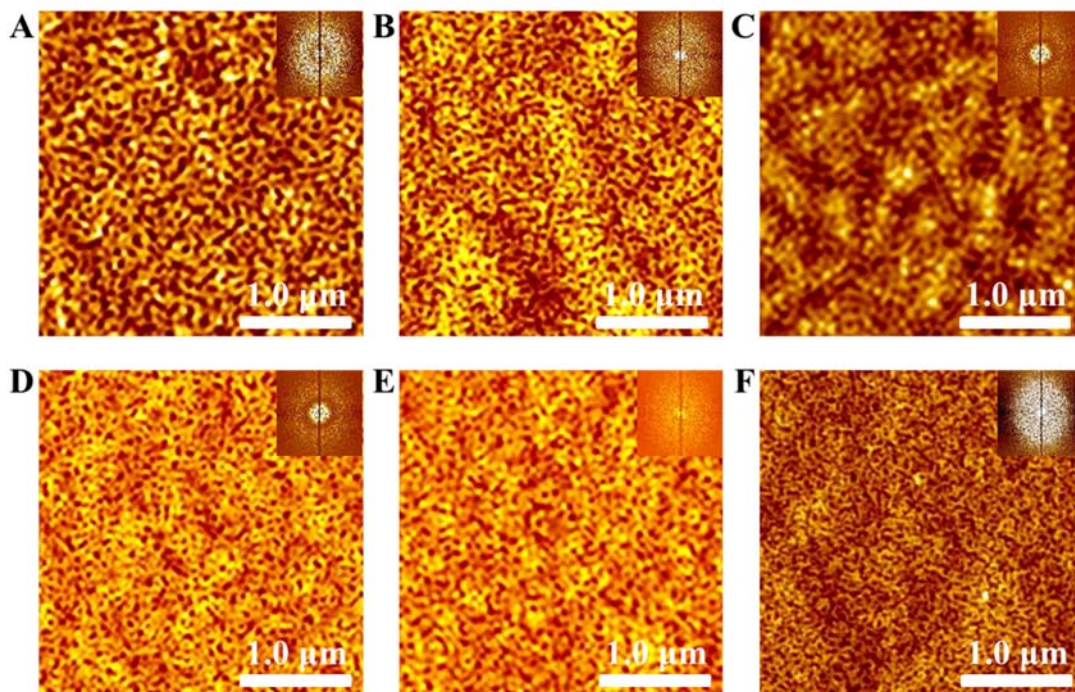| Polymer	f_{Rosin} (Theo)	q^* (nm^{-1})	D ($2\pi/q^*$) (nm)	q_1 (nm^{-1})	q / q^*
T1	0.78	0.15	42	0.30	1, 2
T2	0.68	0.14	45	0.28	1, 2
T3	0.63	0.13	48	0.26	1, 2
P1	0.78	0.11	57	0.22	1, 2
P2	0.68	0.11	57	0.22	1, 2
P3	0.63	0.09	70	0.17	1, 2

Figure S6. AFM height images of thin films of (A) **P1**; (B) **P2**; (C) **P3**; (D) **T1**; (E) **T2**; (F) **T3** prepared immediately after spin coating. FFTs of each image are shown in the insets.
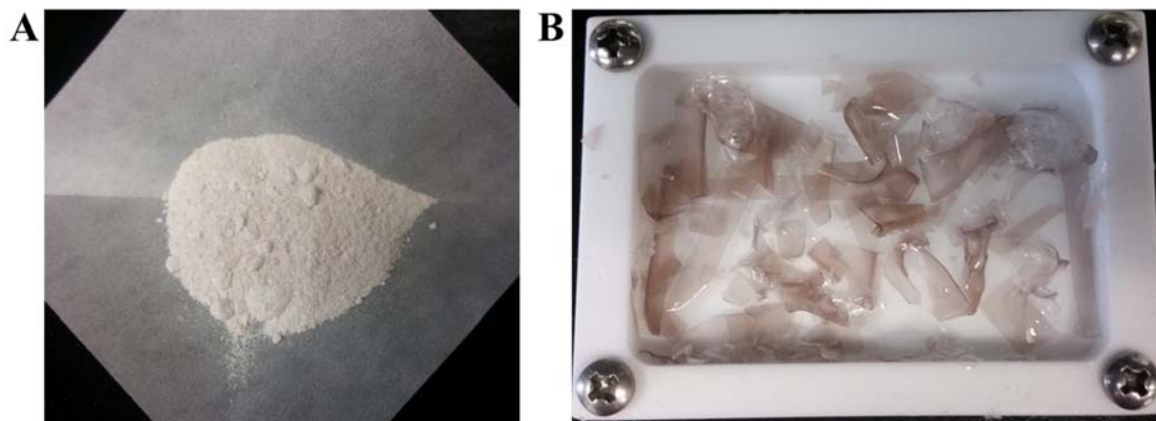
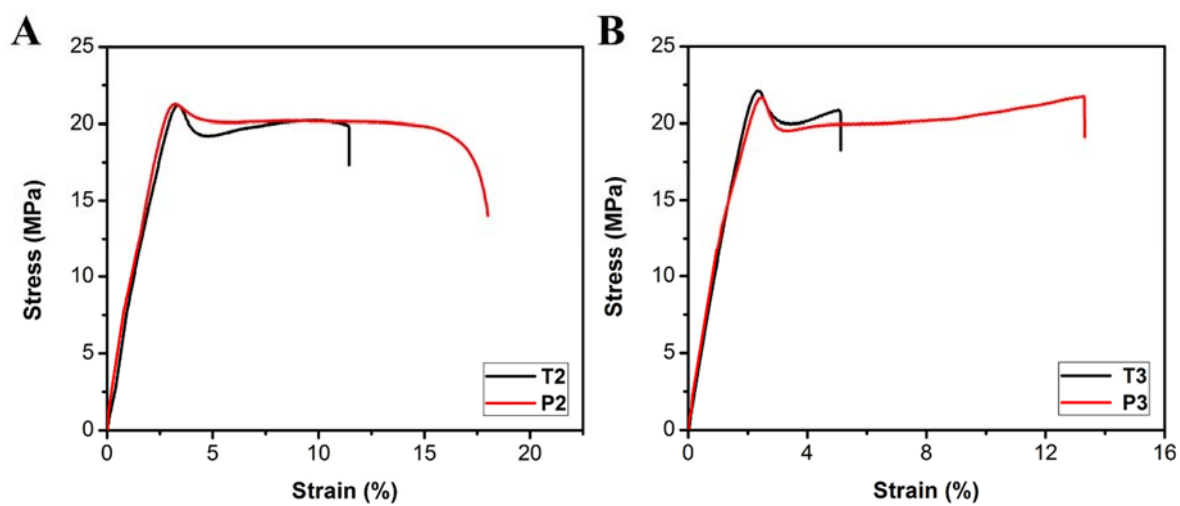**Figure S7**. Images of H1 polymer: (A) powder and (B) brittle films.

Figure S8. Uniaxial stress-strain curves for the (A) **T2** and **P2;** (B) **T3** and **P3**.