

Supporting Information

Synthesis and Characterization of a Terpene-Based Sustainable Polymer: Poly-Alloocimene

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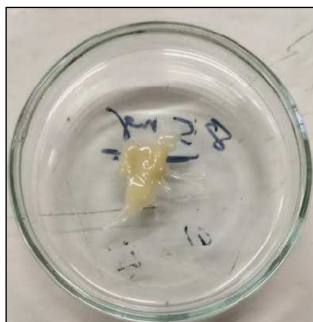


Figure S1. Picture of synthesized polymer

Table S1. Alternative recipe used for redox-initiated emulsion polymerization.

Ingredients	Amount (g, in phr ^a)*	Amount (g, in phr ^a)**
Monomer	100	100
DI water	134	134
Potassium oleate(C ₁₈ H ₃₃ KO ₂)	4.5	4.5
Potassium chloride (KCl)	0.3	0.3
Potassium phosphate tribasic (K ₃ PO ₄)	2.0	2.0
Ferrous sulphate heptahydrate (FeSO ₄ . 7H ₂ O)	0.01	0.01
Ethylenediaminetetraacetic acid sodium salt(Na-EDTA)	0.05	0.05
Sodium hydroxy methanesulfinate (SHS)	0.05	---
Ammonium persulfate (APS)	---	0.007

^aParts per hundred parts of rubber.

*SHS was used in place of Na₂S₂O₅ in this recipe.

**APS was used in place of TBHP in this recipe.

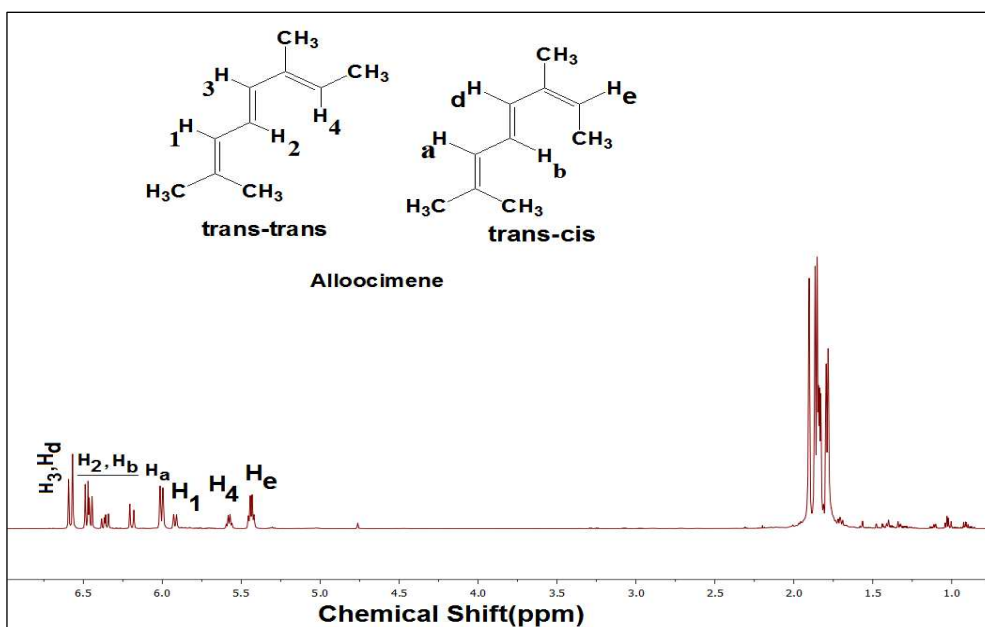


Figure S2. ¹H NMR Spectrum of Allo (distilled).

Allo (distilled): ¹H NMR (CDCl₃, 600 MHz): Only chemical shift of olefinic protons are shown.

Trans-trans: δ-5.9 (1H, H₁), δ-6.4 (1H, H₂), δ-6.6 (1H, H₃), δ-5.6 (1H, H₄).

Trans-cis: δ-6.0 (1H, H_a), δ-6.3 (1H, H_b), δ-6.6 (1H, H_c), δ-5.4 (1H, H_d).

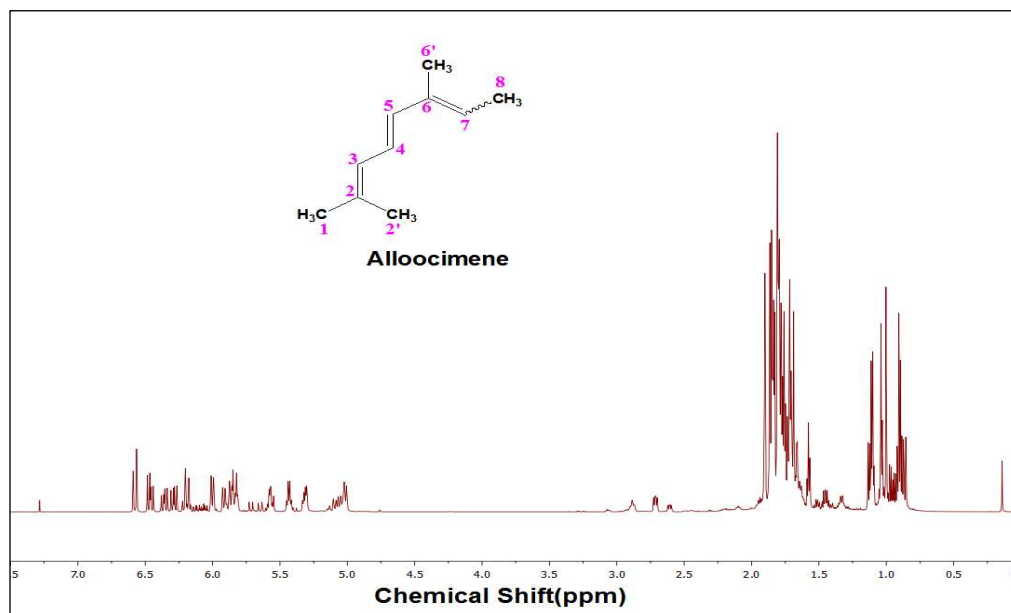


Figure S3. ^1H NMR Spectrum of Allo (residue).

Due to several overlapped peaks, the exact composition of Allo (residue) couldn't be identified.

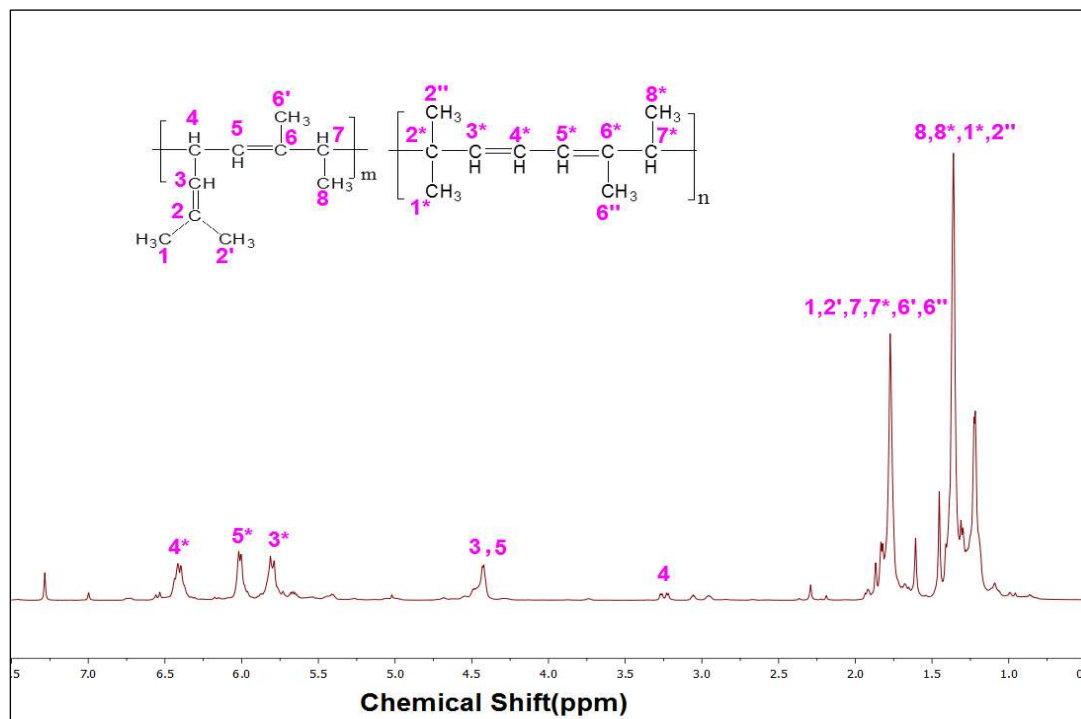


Figure S4. ^1H NMR Spectrum of polymer PAIlo (with distilled Allo).

PAIlo (distilled): ^1H NMR (CDCl_3 , 600MHz)

δ - 6.4(4*H), δ -6.0(5*H), δ -5.7(3*H), δ -4.4(3H, 5H), δ -3.2(4H), δ -1.6-1.9

(1H, 2'H, 7H, 7*H, 6'H, 6''H), δ -1.09-1.45 (8H, 8*H, 1*H, 2''H)

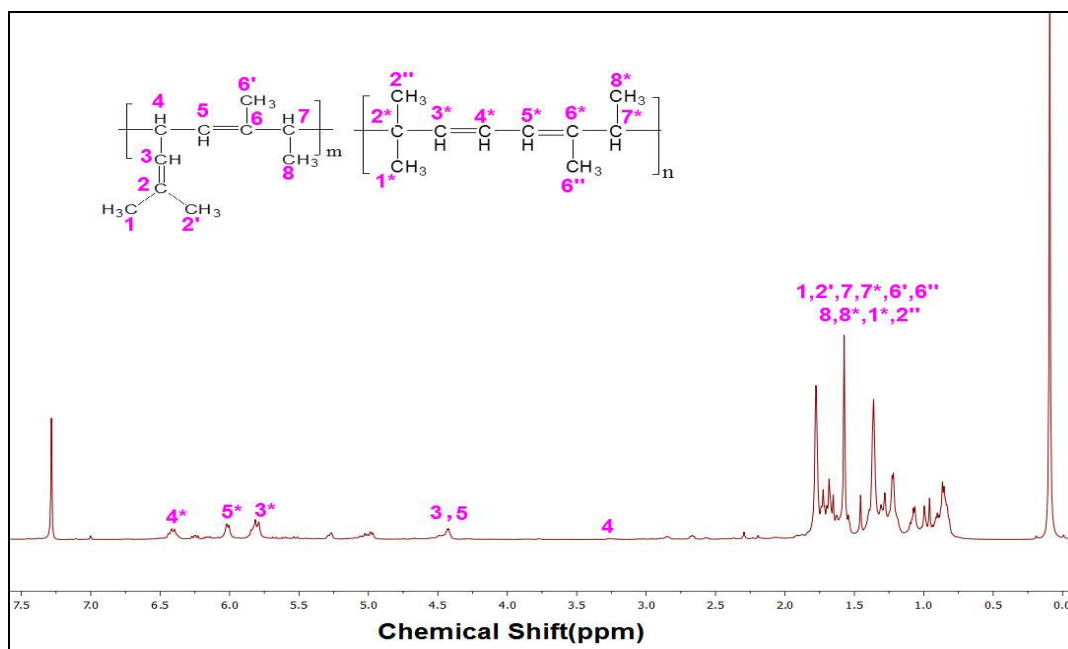


Figure S5. ^1H NMR Spectrum of polymer PAllo (with residue).

PAllo (residue): ^1H NMR (CDCl_3 , 600MHz)

δ -6.4 (4*H), δ -6.0(5*H), δ -5.7 (3*H), δ -4.4 (3H, 5H), δ -3.2 (4H), δ -1.0-1.9

(1H, 2'H, 7H, 7*H, 6'H, 6''H, 8H, 8*H, 1*H, 2''H)

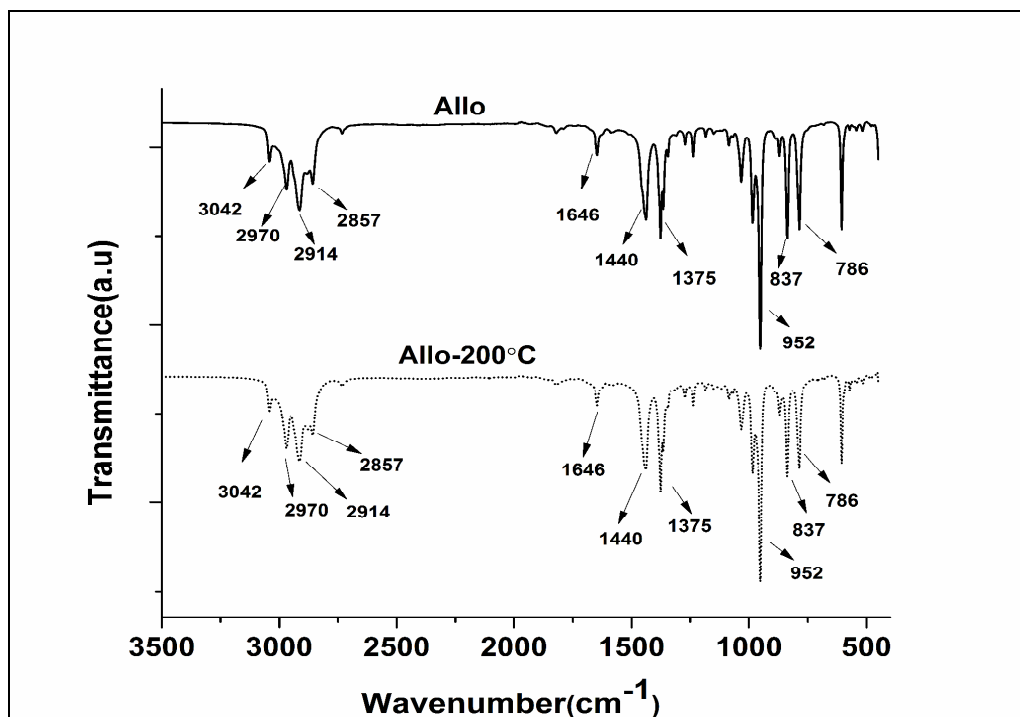


Figure S6. FTIR Spectra of Allo and Allo-200°C

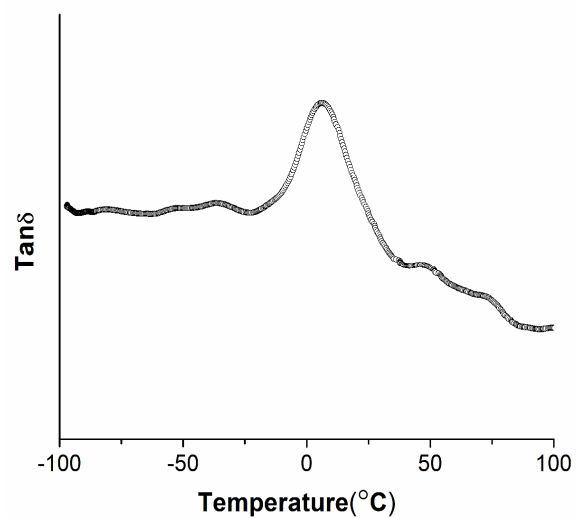


Figure S7. DMA thermogram of PALlo (tanδ vs temperature).