

**Supporting Information for “Synthesis and Properties of Well-Defined Elastomeric
Poly(alkylnorbornene)s and Their Hydrogenated Derivatives” (John D. Hatjopoulos and
Richard A. Register, submitted as a Note to *Macromolecules*)**

Polymerization Details. Norbornene (99%) and trimethylphosphine (PMe_3 , 97%) were purchased from Aldrich and purified by vacuum transfer from Na. Toluene was purified by vacuum transfer from sodium benzophenone ketyl. Benzaldehyde (Aldrich 99.5%, Sure-Seal) was used as received to terminate polymerizations of hexylnorbornene and decylnorbornene; propionaldehyde (Aldrich, 97%) was vacuum-transferred from CaSO_4 and used to terminate norbornene, methylnorbornene, and butylnorbornene polymerizations. After termination, the polymers were recovered by precipitation into methanol and vacuum-dried.

Table S1. Polymerization Rate Constants for 5-*n*-Alkylnorbornene

Monomers at 26°C^a				
monomer	$[\text{M}]_i$	$[\text{Mo}]$	k_p	k'_p
	(mol/l)	(mmol/l)	(l/mol-hr)	(l/mol-hr)
norbornene	0.368	0.692	28000	12000
methylnorbornene	0.320	0.346	-	-
butylnorbornene	0.230	0.346	-	-
hexylnorbornene	0.194	0.346	-	9100
decylnorbornene	0.148	0.346	-	7500

^a $[\text{M}]_i$ represents the starting concentration of monomer, $[\text{Mo}]$ that of initiator. k_p is the bimolecular rate constant; k'_p is the same in the presence of a 5:1 molar ratio of PMe_3 :Mo.

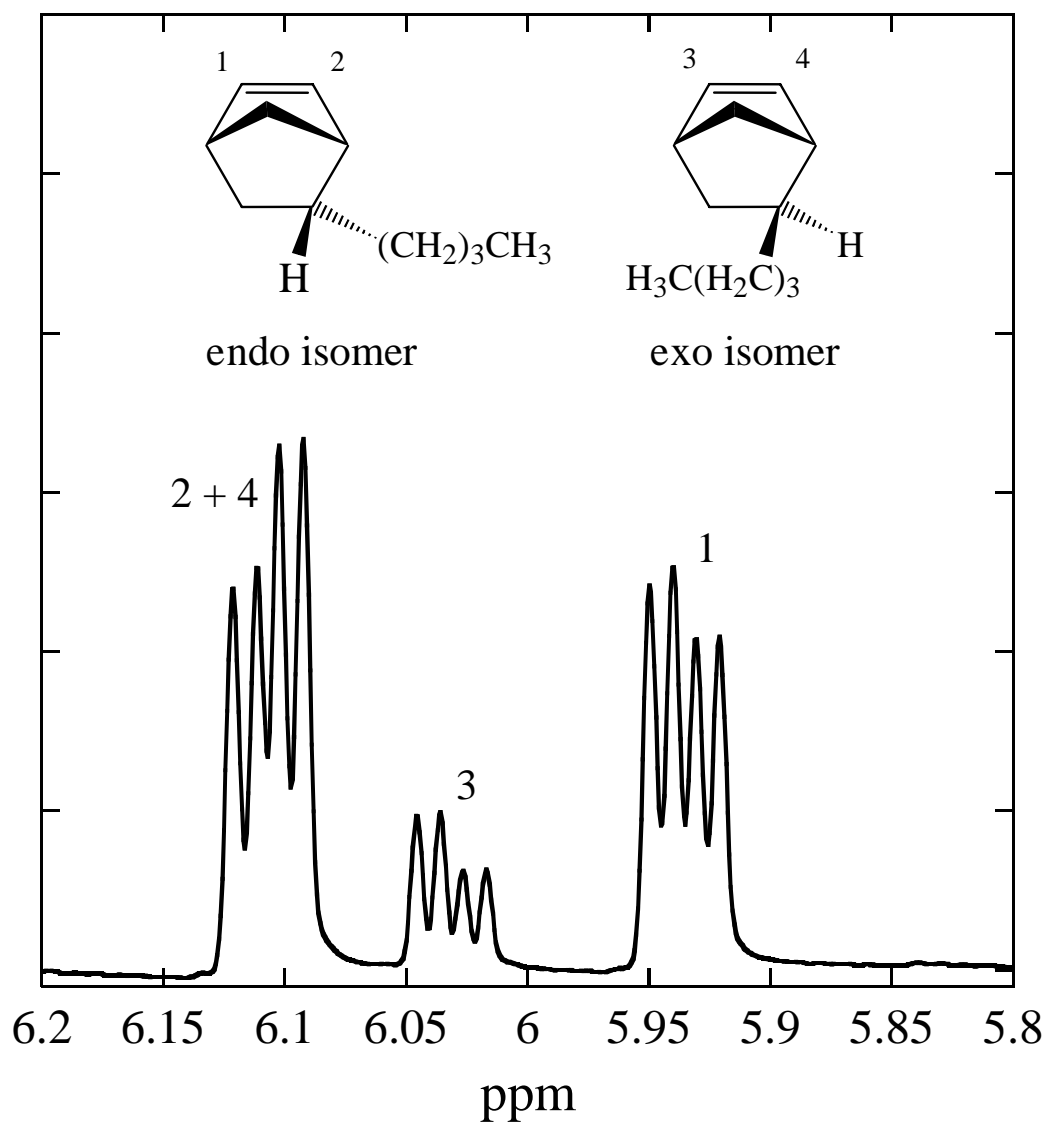


Figure S1. Olefinic region of the ^1H NMR spectrum of 5-*n*-butylbicyclo[2.2.1]hept-2-ene monomer. The endo/exo ratio is found to be 76/24 from the areas of the indicated resonances.

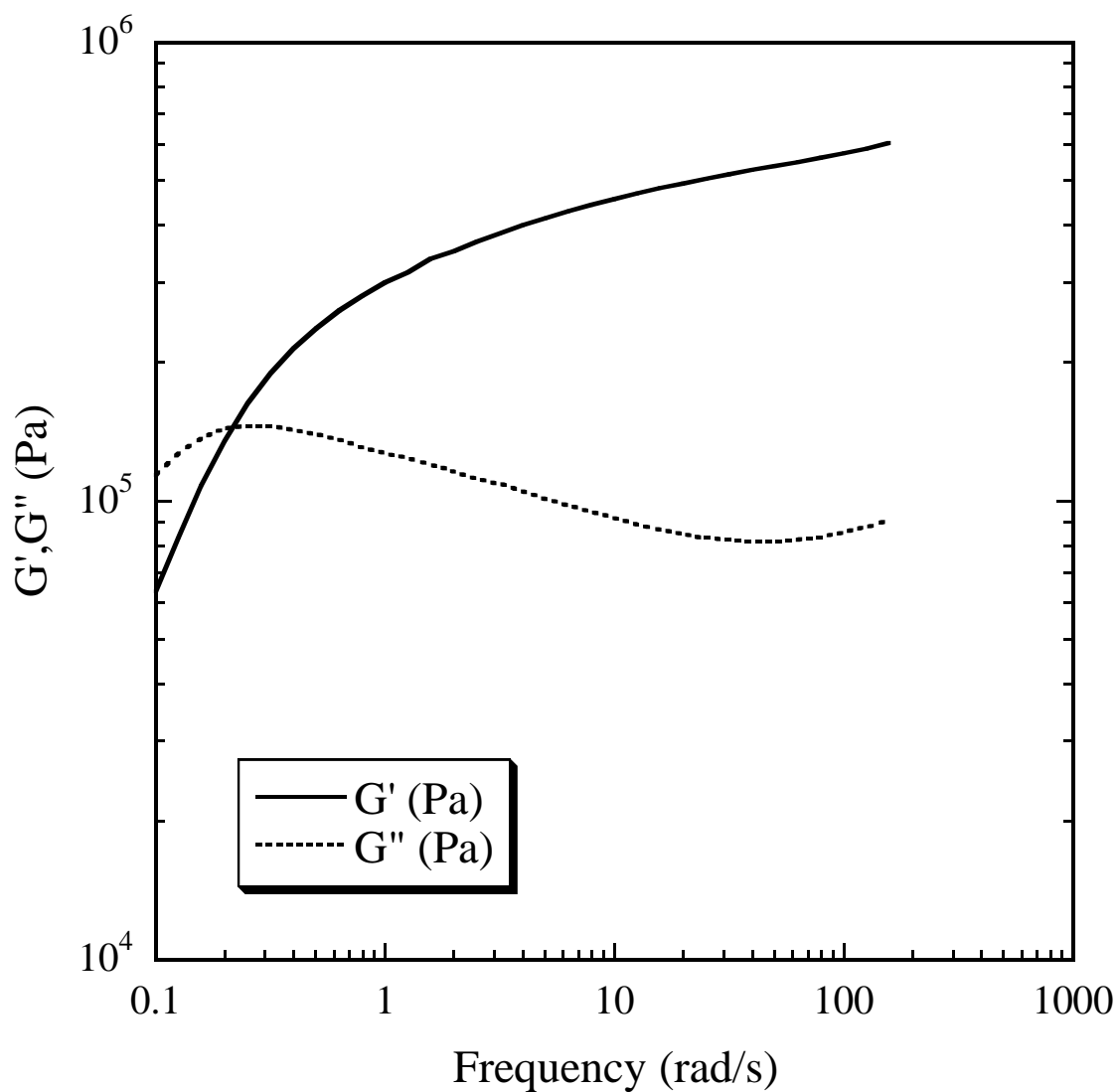


Figure S2. Dynamic frequency sweep at 31°C for hydrogenated poly(butyl norbornene). The plateau modulus $G_0 = 0.54$ MPa is evaluated from the value of G' at $\omega = 45$ rad/sec, where G'' shows a minimum.

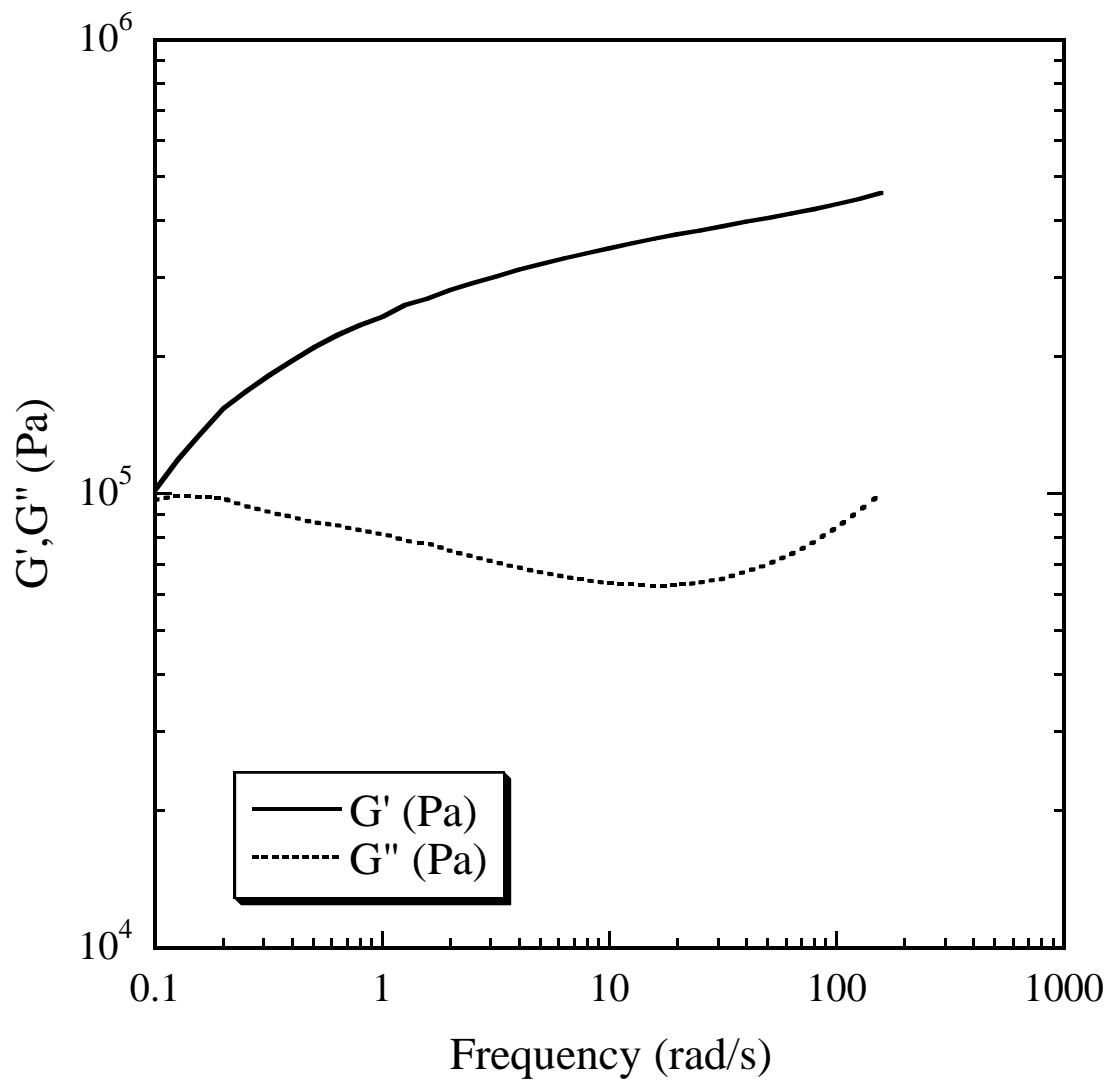


Figure S3. Dynamic frequency sweep at 31°C for hydrogenated poly(hexylnorbornene). The plateau modulus $G_0 = 0.37$ MPa is evaluated from the value of G' at $\omega = 16$ rad/sec, where G'' shows a minimum.

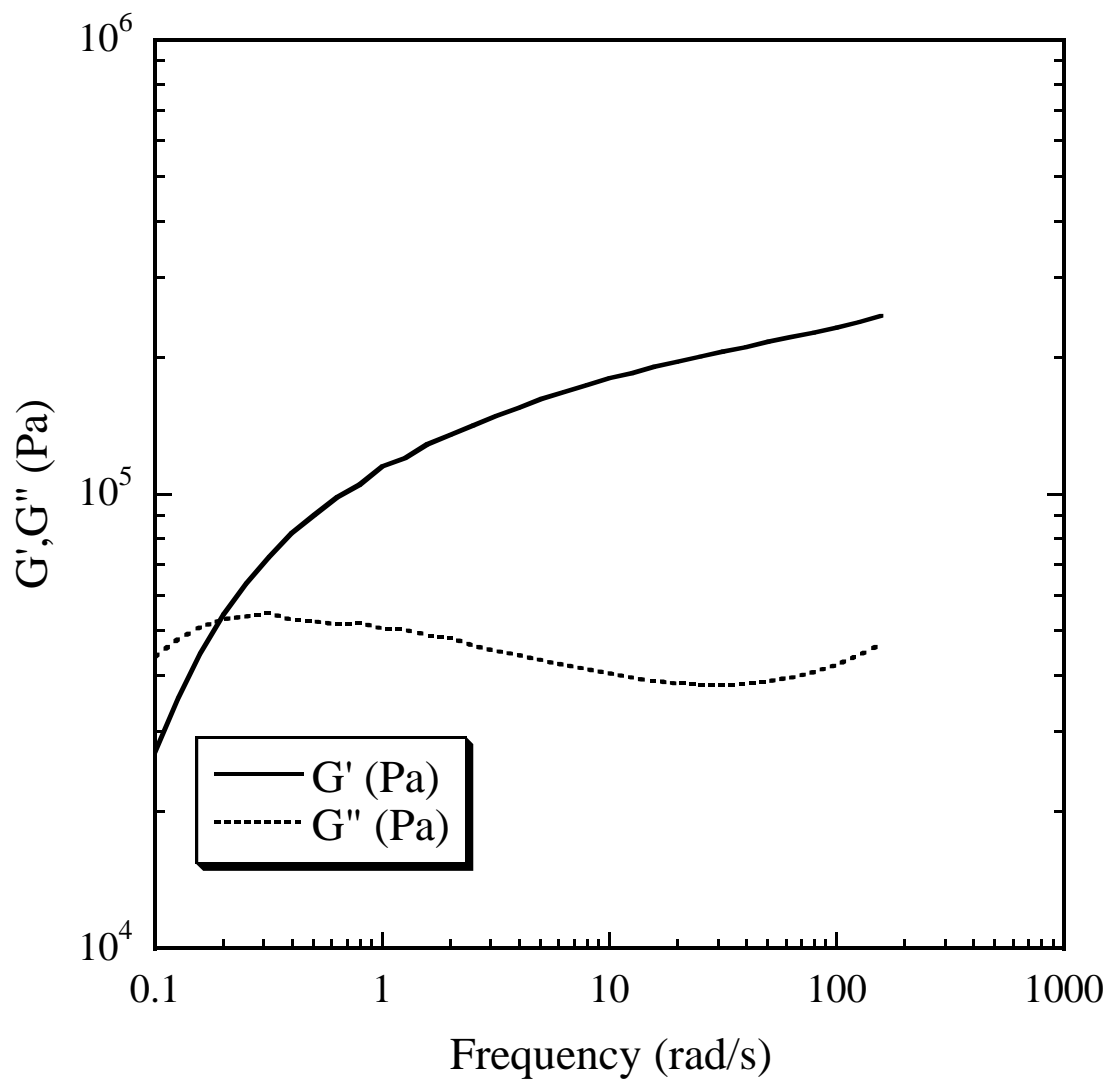


Figure S4. Dynamic frequency sweep at 31°C for hydrogenated poly(decylnorbornene). The plateau modulus $G_0 = 0.20$ MPa is evaluated from the value of G' at $\omega = 30$ rad/sec, where G'' shows a minimum.