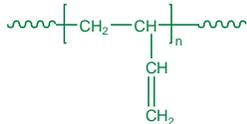


Sample Name: Polybutadiene
(rich in 1,2 microstructure)
(1,2=80% trans-1,4 =12% , cis 1,4 = 8%)

Sample #: P5897-Bd

1,2 rich microstructure: (>80%)



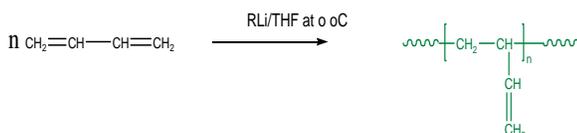
Composition:

M _n x 10 ³	PDI
75.0	1.10
T _g (°C)	-21

Synthesis Procedure:

Polybutadiene (1,2-rich) is obtained by living anionic polymerization in THF. The reaction scheme is shown below:

1,2 addition:



Characterization:

The molecular weight and polydispersity index (PDI) are obtained by size exclusion chromatography (SEC) in THF. SEC analysis was performed on a Varian liquid chromatograph equipped with refractive and UV light scattering detectors. Three SEC columns from Supelco (G6000-4000-2000 HXL) were used with triple detectors from Viscotek Co.

Polymer microstructure can be confirmed by ¹H-NMR where the spectrum of 1,2-polybutadiene contains 1 vinylic proton signal at 5.4 ppm and 2 vinylic protons at 5.0 ppm but the spectrum of 1,4-polybutadiene only contains vinylic signals at 5.4 ppm.

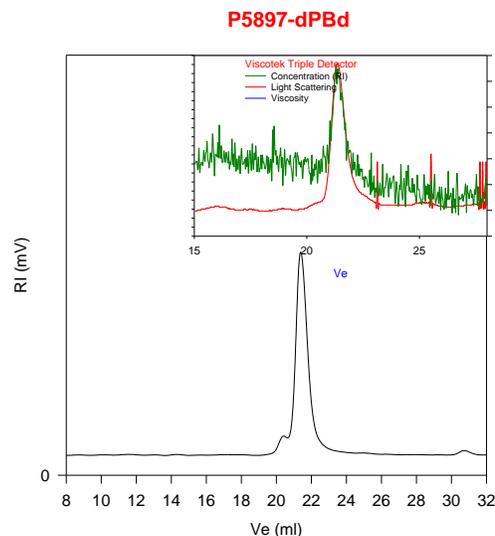
Thermal analysis:

Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of 10°C/min. The midpoint of the slope change of the heat flow plot of the second heating scan was considered as the glass transition temperature (T_g).

Solubility:

Polybutadiene is soluble in THF, toluene, hexane, pentane and cyclohexane and precipitates from methanol and ethanol.

SEC of Homopolymer



Size exclusion chromatography of deuterated polybutadiene(d₈) (rich in 1,4 microstructure):
M_n=75,000, M_w=82,500, M_w/M_n=1.10
Solution viscosity in THF at 35 °C: 1.192 dl/g
dn/dc in THF at 35 °C: 0.127 ml/g Rgw: 12.50 nm

Thermogram for the polymer

