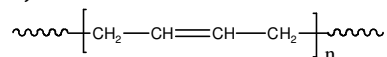


Sample Name: Polybutadiene
(rich in 1,4 microstructure)

Sample #: P2694-Bd
1,4 rich microstructure (cis 68%, trans 27% and 1,2 contents 5%)

1,4 rich microstructure:



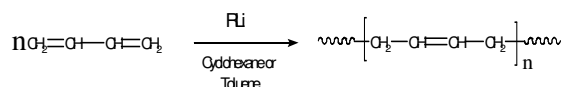
Composition:

$M_n \times 10^3$	PDI
0.9	1.11
$T_g (^{\circ}\text{C})$	-70

Synthesis Procedure:

Polybutadiene (1,4-rich microstructure) is obtained by living anionic polymerization in toluene or cyclohexane. The reaction scheme is shown below:

1,4 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 of 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:

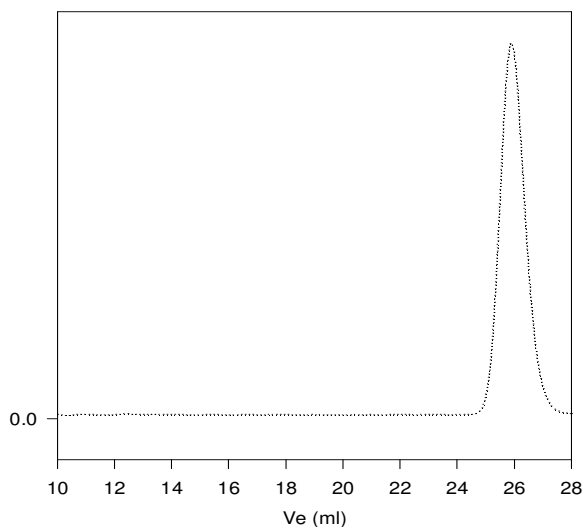
Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of $10^{\circ}\text{C}/\text{min}$. The midpoint of the slope change of the heat flow plot of the second heating scan was considered as the glass transition temperature (T_g).

Solubility:

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

SEC of Homopolymer

P2694-Bd



Size exclusion chromatography of polybutadiene (rich in 1,4 addition):
 $M_n=900$, $M_w=1000$, $PI=1.11$

Thermogram for the polymer

