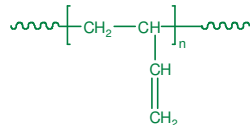


**Sample Name:** Polybutadiene  
(rich in 1,2 microstructure)  
(1,2=85% trans-1,4 =9% , cis 1,4 = 6%)

**Sample #:** P4850-Bd

**1,2 rich microstructure: (>85%)**



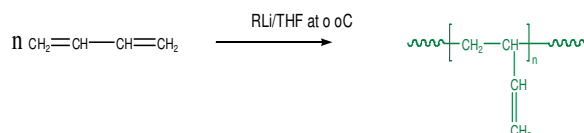
**Composition:**

$M_n \times 10^3$	PDI
110.0	1.04
$T_g (^{\circ}\text{C})$	-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  $^1\text{H}$ -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:**

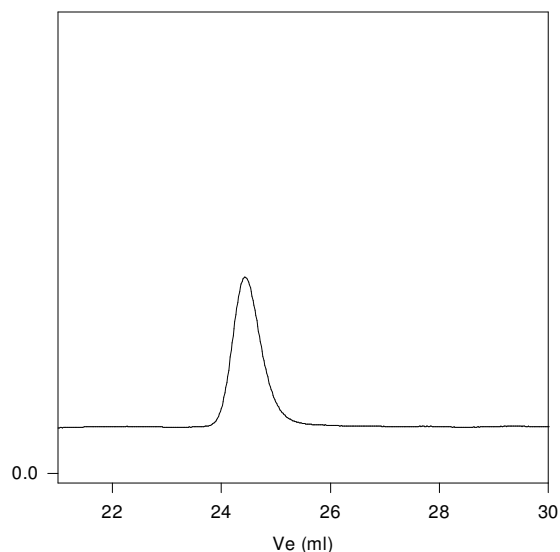
Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of  $10^{\circ}\text{C}/\text{min}$ . The midpoint of the slope change of the heat flow plot of the second heating scan was considered as the glass transition temperature ( $T_g$ ).

**Solubility:**

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

**SEC of Homopolymer**

**P4850-Bd(rich in 1,2 addition)**



Size exclusion chromatography of polybutadiene with respect to polybutadiene standards:  
 $M_n=11000$ ,  $M_w=11500$ ,  $M_w/M_n=1.04$

**Thermogram for the polymer**

