

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

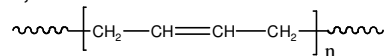
SEC of Homopolymer

P5529-Bd

Sample #: P5529-Bd

1,4 rich microstructure (cis 68%, trans 27% and 1,2 contents 5%)

1,4 rich microstructure:



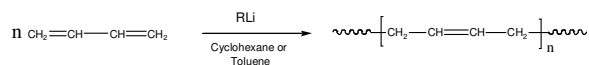
Composition:

| Mn x 10 ³ | PDI |
|----------------------|------|
| 5.0 | 1.09 |

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:



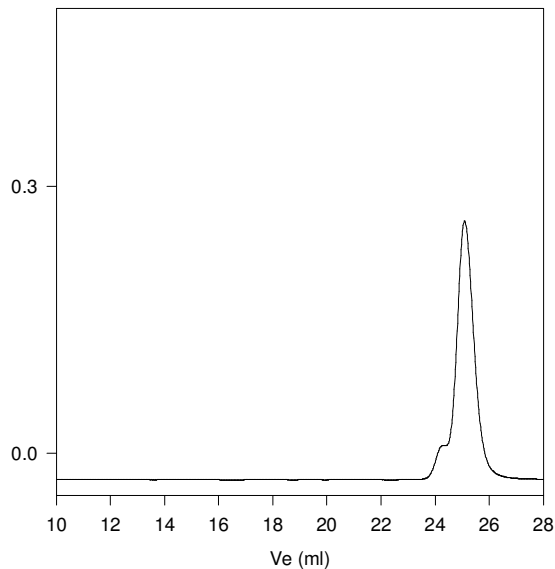
Characterization:

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.

Solubility:

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



Size exclusion chromatography of polybutadiene with respect to polybutadiene standards:

M_n=5,000, M_w=5,500, M_w/M_n=1.09