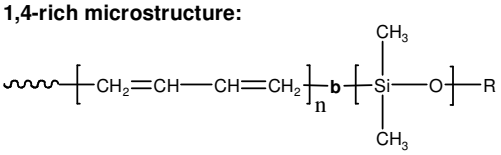
Sample Name: **Poly(butadiene-b-dimethylsiloxane)**
Polybutadiene rich in 1,4 microstructure

## Sample #: **P1319-BdDMS**

**1,4-rich microstructure:**



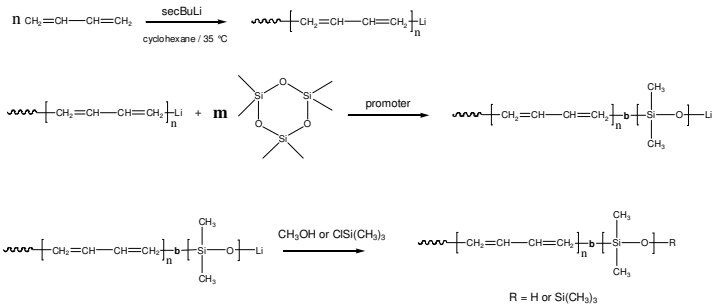
R = H or $Si(CH_3)_3$

**Composition:**

| Mn x $10^3$ Bd-b-DMS (k) | PDI |
|---|---|
| 1.1-b-1.3 | 1.14 |

**Synthesis Procedure:**

Poly(butadiene(1,4 or 1,2 addition)-b-dimethyl siloxane) is prepared by living anionic polymerization with sequence addition of butadiene (Bd) followed by addition of hexamethylcyclotrisiloxane (D3) monomer. The diblock copolymer is prepared by the polymerization of Bd in toluene followed by medium polarity modification through the introduction of freshly distilled THF followed by the addition of D3. The reaction polymerization scheme is illustrated below:

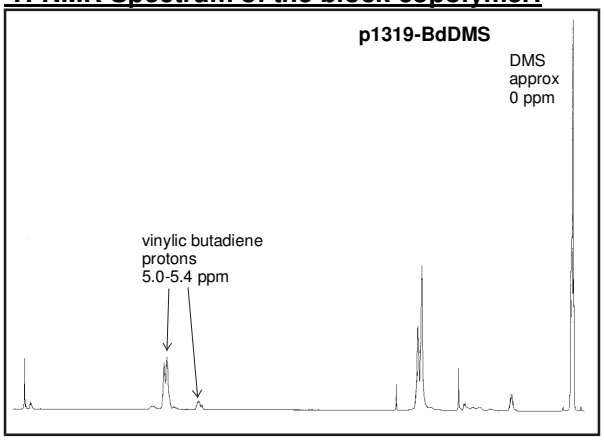


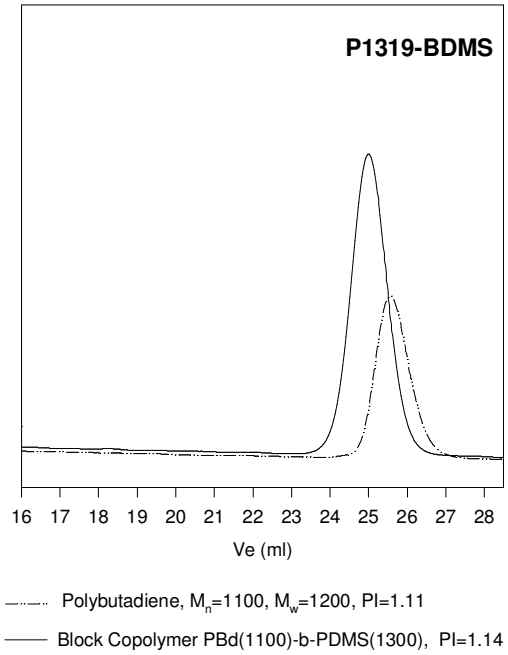

**Characterization:**

An aliquot of the anionic polybutadiene block was terminated before addition of D3 and analyzed by size exclusion chromatography (SEC) to obtain the molecular weight and polydispersity index (PDI). The final block copolymer composition was calculated from $^1$H-NMR spectroscopy by comparing the peak area of the vinylic butadiene protons between about 5.0-5.4 ppm with the siloxane ($SiCH_3$) protons at 0.8-0.9 ppm. The block copolymer PDI was determined by SEC. Note: The $^1$H-NMR of 1,2-polybutadiene is composed of 1 proton signal at 5.4 ppm and 2 proton signals at 5.0 ppm. Signals due to vinylic 1,4-polybutadiene are also present at 5.4 ppm.

**Solubility:**
Poly(butadiene-b-dimethylsiloxane) block copolymer is soluble in toluene, cyclohexane, hexane, THF, $CHCl_3$, The polymer can be precipitated from ethanol, methanol, water.

## $^1$H-NMR Spectrum of the block copolymer:




## SEC of the block copolymer: