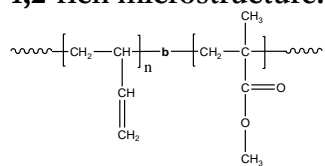


**Sample Name:** Poly(butadiene -b-methyl methacrylate)  
**Polybutadiene rich in 1,2 microstructure (>85%)**  
**Sample #:** P18169P-BdMMA  
**1,2-rich microstructure:**



### Composition:

Mn x 10 <sup>3</sup> Bd-b-MMA	PDI
25.0-b-88.0	1.6
T <sub>g</sub> for Bd block: -14°C	T <sub>g</sub> for MMA block: 132°C

### Synthesis Procedure:

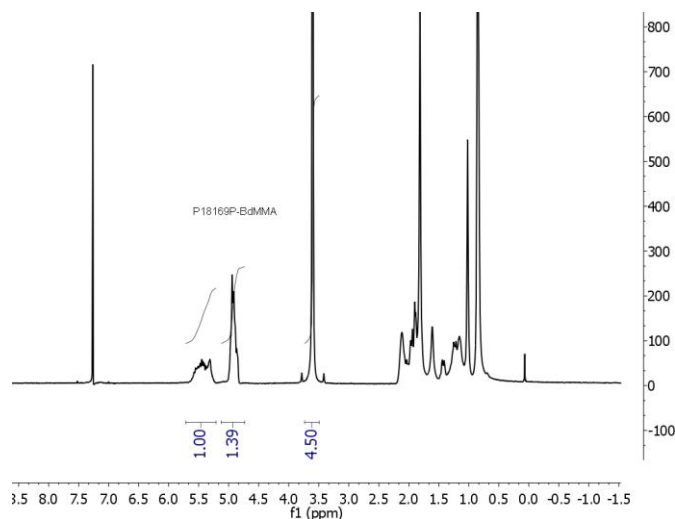
Poly(butadiene (1,2 addition)-b-methyl methacrylate) is prepared by living anionic polymerization with sequence addition of butadiene (Bd) followed by methyl methacrylate monomer (MMA). **Characterization:**

An aliquot of the anionic polybutadiene block was terminated before addition of methyl methacrylate and analyzed by size exclusion chromatography (SEC) with on line-triple detectors to obtain the molecular weight and polydispersity index (PDI). The final block copolymer composition was calculated from <sup>1</sup>H-NMR spectroscopy by comparing the peak area of the vinylic butadiene protons between about 5.0-5.4 ppm with the methyl methacrylate protons at 3.6 ppm. Block copolymer PDI is determined by SEC.

**Note:** The <sup>1</sup>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.

**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<sub>g</sub>). **Solubility:** Polymer is soluble in THF, CHCl<sub>3</sub>, toluene, dioxane. The polymer can be precipitate out in ethanol, methanol.

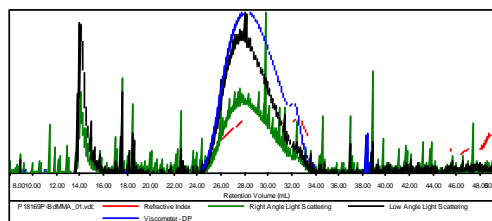
### <sup>1</sup>H-NMR Spectrum



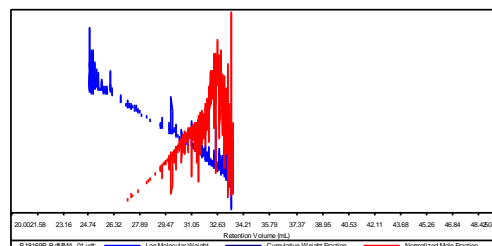
### SEC of the block copolymer:

Sample ID: P18169-BdMMA

Concentration (mg/mL)	6.2875
Sample dn/dc (mL/g)	0.1050
Method File	PS80K-Sep19-2013-0002.vcm
Column Set	3x PL 1113-6300
System	System 1

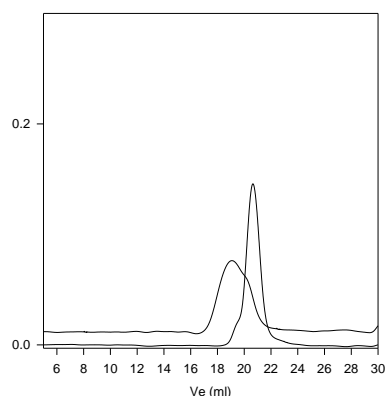


Sample	Mn	Mw	Mp	Mw/Mn	IV
P18169P-BdMMA_01.vdt	112,419	185,805	150,320	1.653	1.1805



P18169P-BdMMA

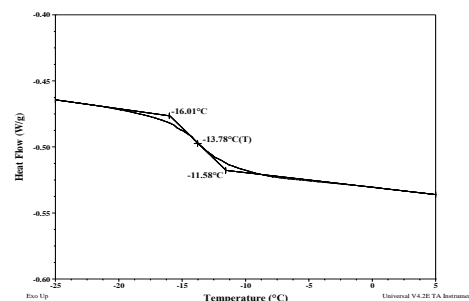
Poly butadiene rich in 1,2 addition



SEC profile of the Block copolymer:

— Polybutadiene, M<sub>n</sub>=25,000, M<sub>w</sub>=26,500, PI=1.07  
 — Diblock Copolymer PBd(25,000)-b-PMMA(88,000), PI=1.6  
 Compositions from HNMR

### DSC thermogram for Bd block:



### DSC thermogram for MMA block:

