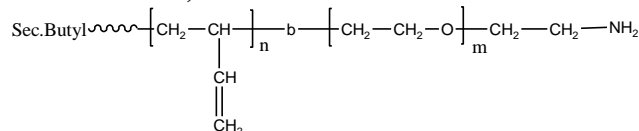


**Sample Name:** Amino end functionalized  
**Poly(butadiene-b-ethylene oxide)**

**Sample #:** P9050-BdEONH2  
(poly butadiene block rich in 1,2 microstructure)

#### Structure of 1,2-rich microstructure:



#### Composition:

Mn x 10 <sup>3</sup> Bd-b-EO	Mw/Mn (PDI)	% 1,2 addition Butadiene
2.5-b-1.3	1.05	89

#### Synthesis Procedure:

Poly(butadiene(1,4 addition or 1,2 addition)-b-ethylene oxide) can be prepared by the different routes as reported in the literature (ref: *Macromolecules* 1996, 29, 6994). The direct synthesis of diblock copolymer using lithium counter ion in the presence of Phosphazene Base *t*-BuP<sub>4</sub> is interesting as reported in *Macromolecules*, 32 (8), 2783 -2785, 1999. These polymers can also be successfully synthesized using the different end functionalized polymers as investigated in our lab. These methodologies are proprietary.

#### Characterization:

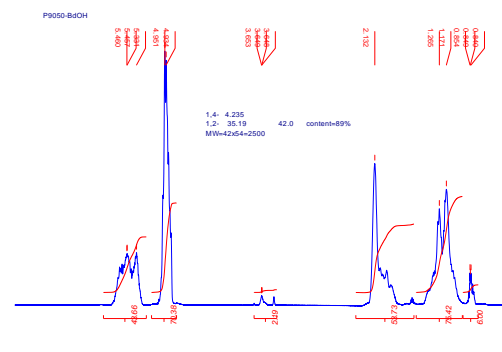
Polybutadiene polymer was analyzed by size exclusion chromatography (SEC) to obtain the molecular weight and polydispersity index (PDI). The final block copolymer composition was calculated from <sup>1</sup>H-NMR spectroscopy by comparing the peak area of the vinylic butadiene protons between about 5.0-5.4 ppm with the ethylene oxide 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.

#### Solubility:

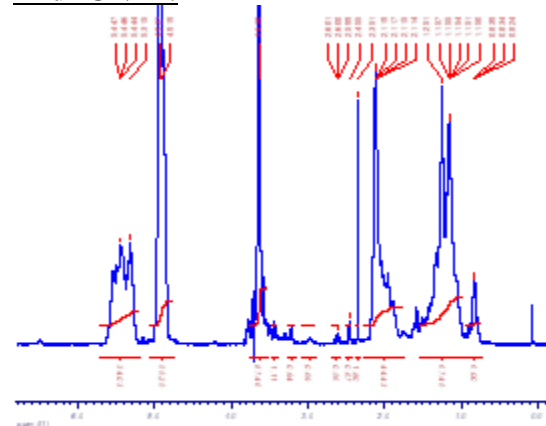
Amino end functionalized Poly(butadiene-b-ethylene oxide) is soluble in THF, CHCl<sub>3</sub>, and toluene. The polymer has variable solubility in hexane, methanol, ethanol and water depending on its composition.

#### <sup>1</sup>H NMR spectrum of the sample at different steps:

##### PBd-OH:

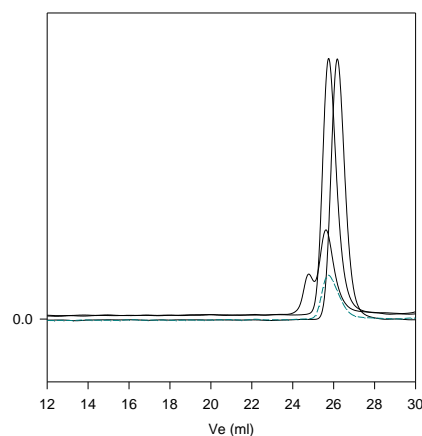


##### PBdEONH2:



#### SEC profile of the block copolymer:

P9050-Bd<sub>1,2 rich</sub>EO-NH2

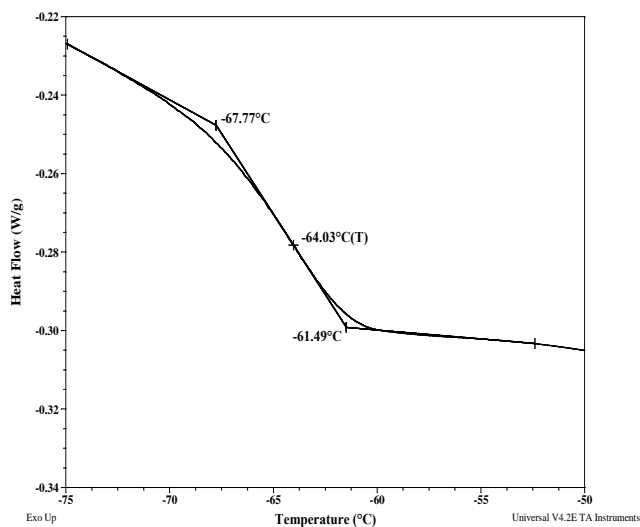


Size Exclusion Chromatogram of Poly(butadiene-b-ethylene oxide)  
 — Polybutadiene: M<sub>n</sub>=2500, M<sub>w</sub>=2600, M<sub>w</sub>/M<sub>n</sub>=1.06  
 — PBd-b-PEO: M<sub>n</sub> PBd(2500)-PEO(1300), M<sub>w</sub>/M<sub>n</sub>=1.05

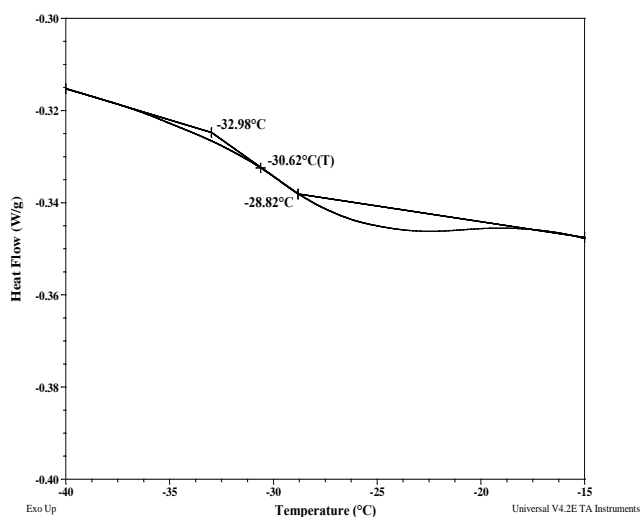
### Thermal analysis of the sample P9050-BdEO

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 ( $T_g$ ).

#### Thermogram for PEO block:



#### Thermogram for PBd block:



### Thermal analysis results at a glance

For Bd block		
$T_g$ : -31°C	$T_m$ : -	$T_c$ : -
For PEO block		
$T_g$ : -64°C	$T_m$ : 48°C	$T_c$ : Not found

### Melting and crystallization curve for the sample

The melting temperature ( $T_m$ ) was taken as the maximum of the endothermic peak where as the crystallization temperature ( $T_c$ ) was considered as the minimum of the exothermic peak.

#### Melting curve for PEO block:

