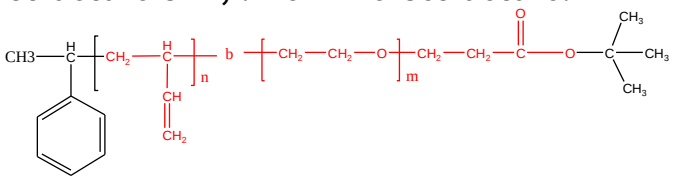
Sample Name: **tert.butyl propionate Terminated Poly(butadiene-b-ethylene oxide)**

Poly butadiene rich in 1,2 or 1,4 microstructure

Sample #: **P10085-BdEOCOOtBuA**

(poly butadiene block rich in 1,2 microstructure)

Structure of 1,2-rich microstructure:



Composition:

Mn x 10^3 Bd-b-EO	Mw/Mn (PDI)	% 1,2 addition Butadiene
6.0-b-5.5	1.17	75

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, 1994). The direct synthesis of diblock copolymer using lithium counter ion in the presence of **Phosphazene Base *t*-**BuP_4 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.

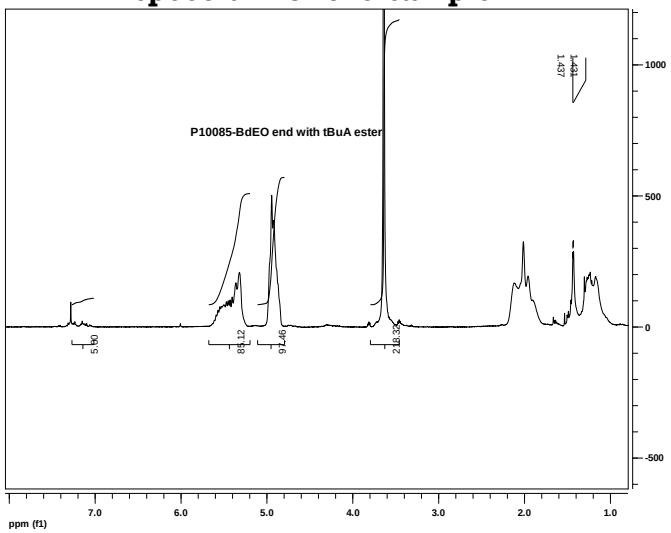
Characterization:

OH terminated 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 ^{1}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 ^{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:

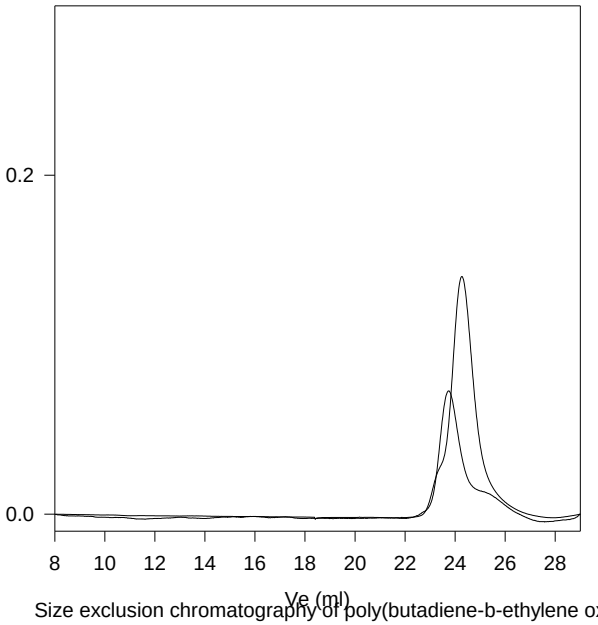
Poly(butadiene-b-ethylene oxide) is soluble in THF, $CHCl_3$, and toluene. The polymer has variable solubility in hexane, methanol, ethanol and water depending on its composition.

^{1}H NMR spectrum of the sample



SEC profile of the block copolymer

P10085-BdEO tBuA ester



Size exclusion chromatography of poly(butadiene-b-ethylene oxide):

—— 1,2 polybutadiene M_n=6000, M_w=6600, PI=1.15

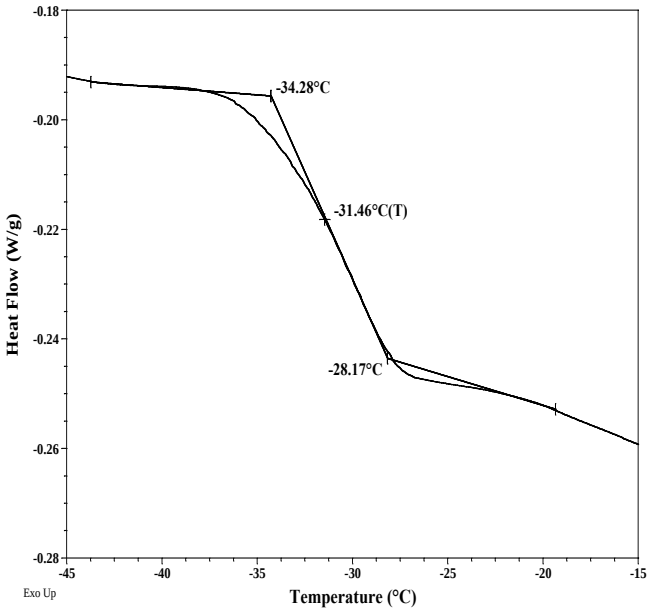
Thermal analysis of the sample# P10085-BdEOCOOtBuA

Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of 10 ^{o}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).

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.

Thermogram for PS block



Thermal analysis results at a glance

Sample	T_m (^{o}C)	T_c (^{o}C)	T_g (^{o}C)
Bd	-	-	-31
EO	39	08	Not distinct

Melting and crystallization curves for PCL