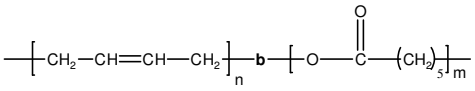
Sample Name: Poly(1,4-butadiene-b-ε-caprolactone)

Sample #: P2077-BdCL

Structure:

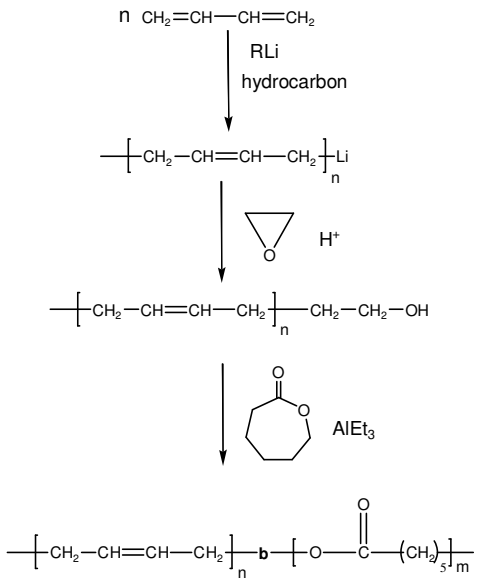


Composition:

Mn × 10^3 Bd-b-CL	Mw/Mn (PDI)
32.0-b-33.0	1.07

Synthesis Procedure:

Poly(1,4-butadiene-b-ε-caprolactone) is prepared by living anionic polymerization addition of butadiene followed coordination polymerization of ε-caprolactone. The reaction scheme is shown below:



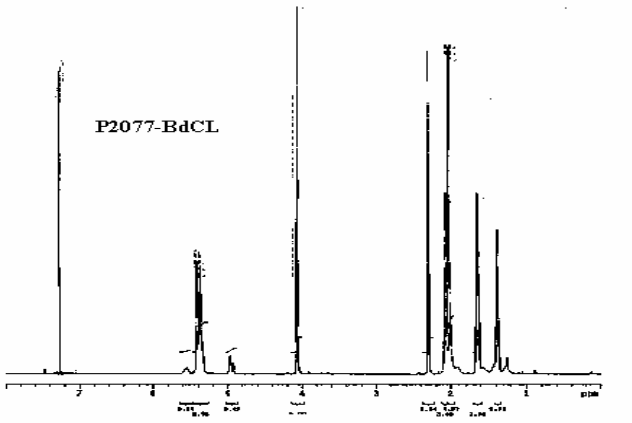
Characterization:

An aliquot of the anionic poly(butadiene) block was terminated before addition of ε-caprolactone 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 at about 5.4 ppm with the e-caprolactone protons at about 4.1ppm. Block copolymer PDI is determined by SEC.

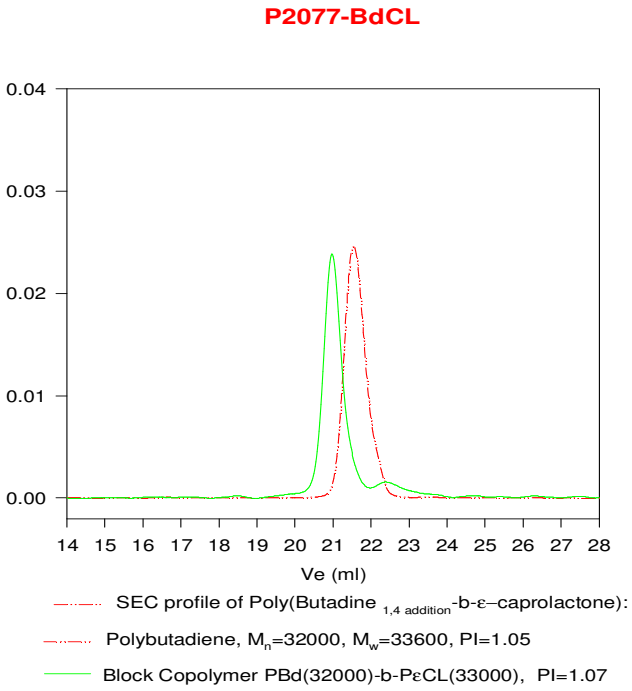
Solubility:

The polymer is soluble in tetrahydrofuran (THF) and chloroform ($CHCl_3$).

^{1}H NMR of the block polymer:



SEC of the block copolymer:



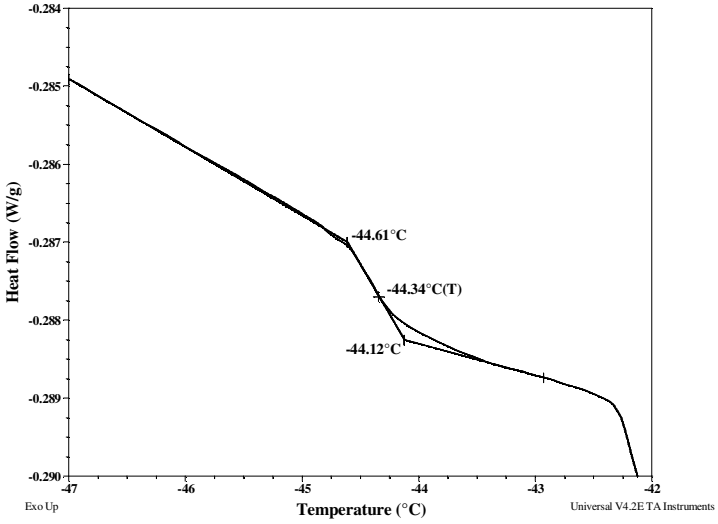
Thermal analysis of the sample# P2077-BdCL

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).

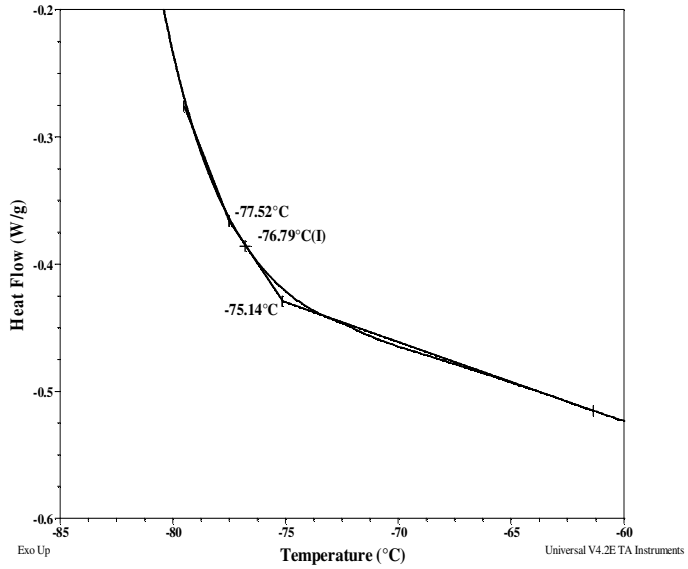
Melting and crystallization curve for the sample

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 CL block:



Thermogram for Bd block:



Thermal analysis results at a glance

Sample	T_m (°C)	T_c (°C)	T_g (°C)
Bd block	-	-	-77
CL block	61	18	-44

Melting and crystallization curve for ε-caprolactone block: