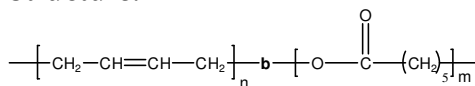


**Sample Name:** Poly(1,4-butadiene-b-ε-caprolactone)

**Sample #:** P2058-BdCL

**Structure:**

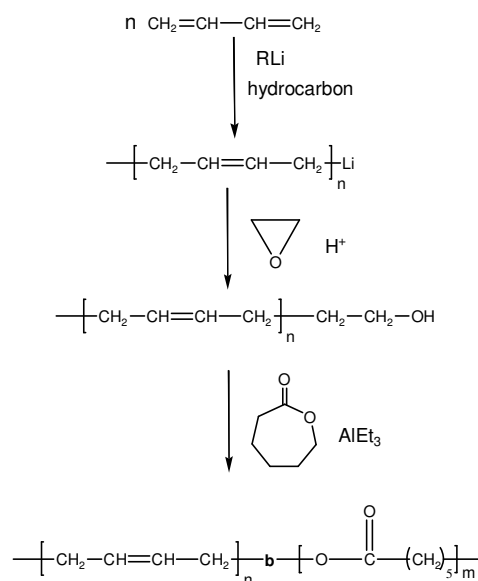


**Composition:**

$M_n \times 10^3$ Bd-b-CL	$M_w/M_n$ (PDI)
32.0-b-40.0	1.21

**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:



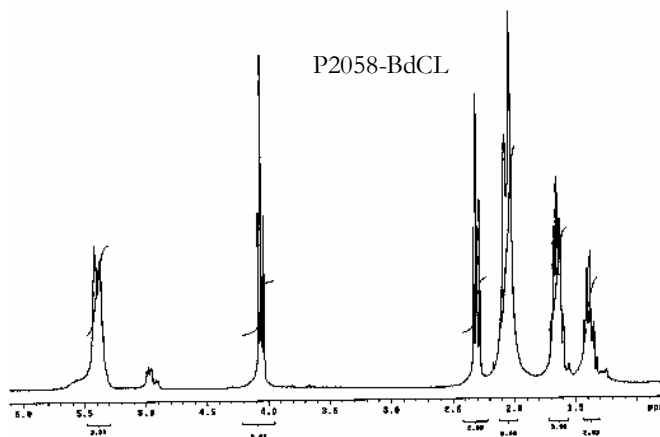
**Characterization:**

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 <sup>1</sup>H-NMR spectroscopy by comparing the peak area of the vinylic butadiene protons at about 5.4 ppm with the ε-caprolactone protons at about 4.1 ppm. Block copolymer PDI is determined by SEC.

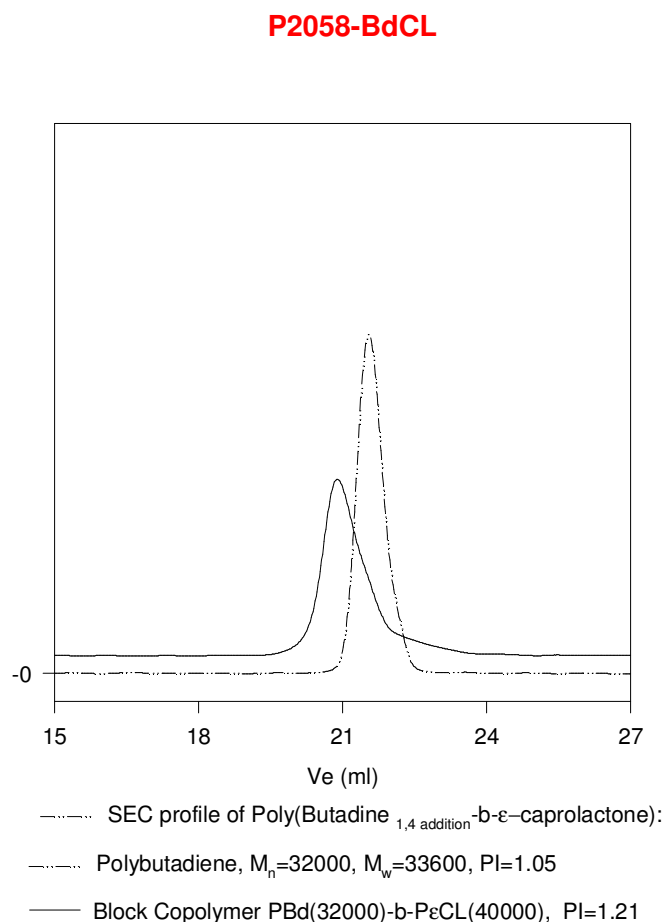
**Solubility:**

The polymer is soluble in tetrahydrofuran (THF) and chloroform (CHCl<sub>3</sub>).

**<sup>1</sup>H NMR of the block polymer:**



**SEC of the block copolymer:**



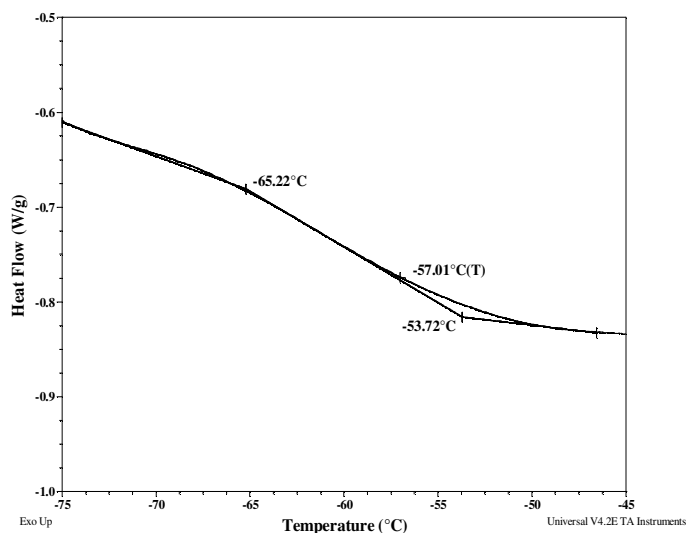
## Thermal analysis of the sample# P2058-BdCL

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.

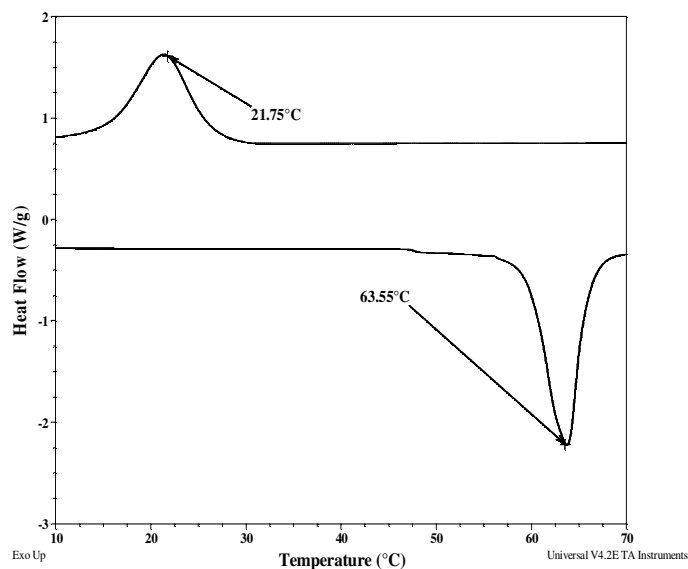
### Thermogram for CL block:



### Thermal analysis results at a glance

Sample	$T_m$ (°C)	$T_c$ (°C)	$T_g$ (°C)
Bd block	-	-	-75
CL block	64	22	-57

### Melting and crystallization curve for $\epsilon$ -caprolactone block:



### Thermogram for Bd block:

