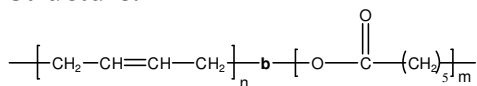


Sample Name: Poly(1,4-butadiene-b-ε-caprolactone)

Sample #: P2041-BdCL

Structure:

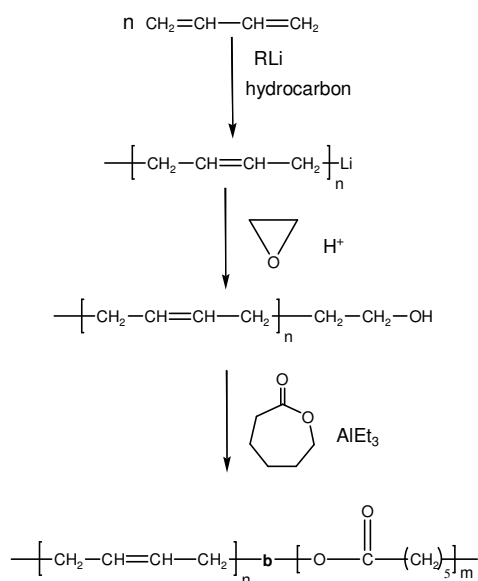


Composition:

$M_n \times 10^3$ Bd-b-CL	M_w/M_n (PDI)
13.0-b-7.9	1.10

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:



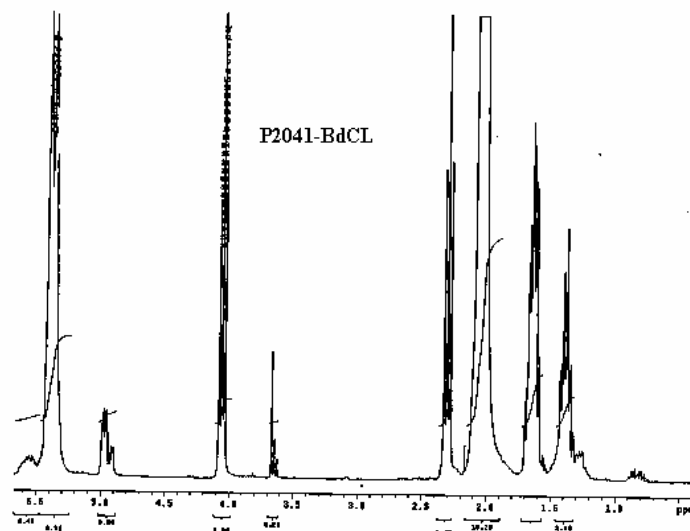
Characterization:

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 ¹H-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:

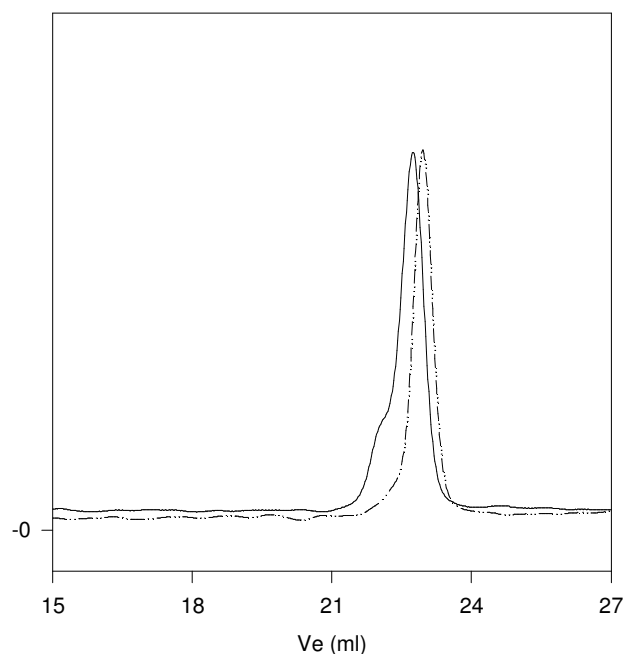
The polymer is soluble in tetrahydrofuran (THF) and chloroform (CHCl₃).

¹H NMR of the block polymer:



SEC of the block copolymer:

P2041-BdCL



- SEC profile of Poly(Butadiene _{1,4} addition-b-ε-caprolactone):
- Polybutadiene, $M_n=13000$, $M_w=14000$, $PI=1.08$
- Block Copolymer PBd(13000)-b-PεCL(7900), $PI=1.10$

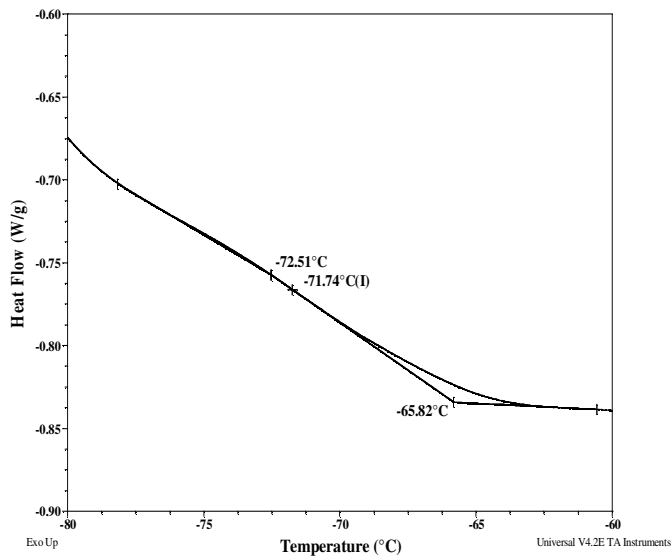
Thermal analysis of the sample# P2041-BdCL

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.

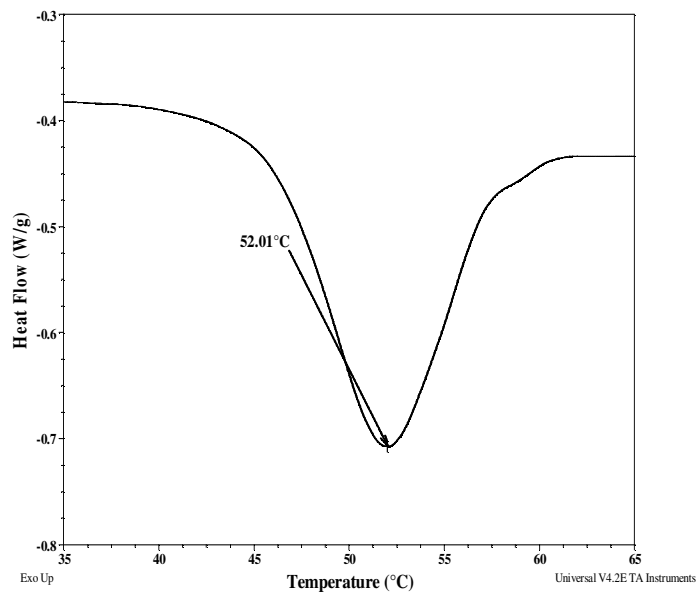
Thermogram for Bd block:



Thermal analysis results at a glance

Sample	T_m (°C)	T_c (°C)	T_g (°C)
Bd block	-	-	-72
CL block	52	Not found	-50

Melting curve for ε-caprolactone



Thermogram for CL block:

