Sample Name:
Poly(ethylene oxide -b- ε -caprolactone)

Sample #: **P8307- EOCL**

Structure:

$CH_3-O\left[CH_2-CH_2-O\right]_n \textbf{-b-}\left[\overset{\overset{O}{\parallel}}{C}-(CH_2)_5-O\right]_m H$
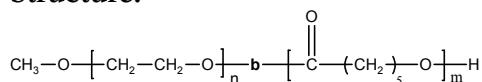
Composition:

| Mn x 10³ PEO-b-PCL	PDI
5.0-b-10.0	1.2

Synthesis Procedure:

Poly(ethylene oxide -b- ε -caprolactone) is prepared by living anionic polymerization of ethylene oxide and coordination polymerization of ε -caprolactone.

Characterization:

An aliquot of the anionic poly(ethylene oxide) block was terminated before addition of 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 ethylene oxide protons at about about 3.6 ppm with the ε-caprolactone protons at about 4.1 ppm.

Solubility:

Poly(ethylene oxide -b- ε -caprolactone) is soluble in CHCl3, THF, DMF, toluene and precipitated out from cold ethanol, diethyl ether.

^{1}H-NMR Spectrum of the block copolymer:
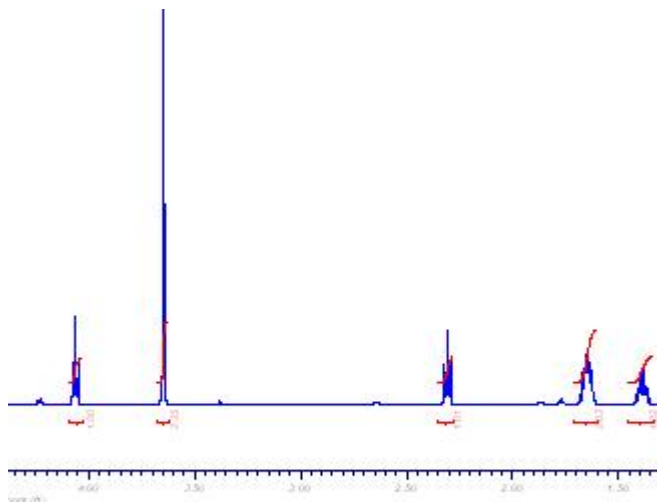
SEC of the block copolymer:

P8307- EOCL

Ve (ml)
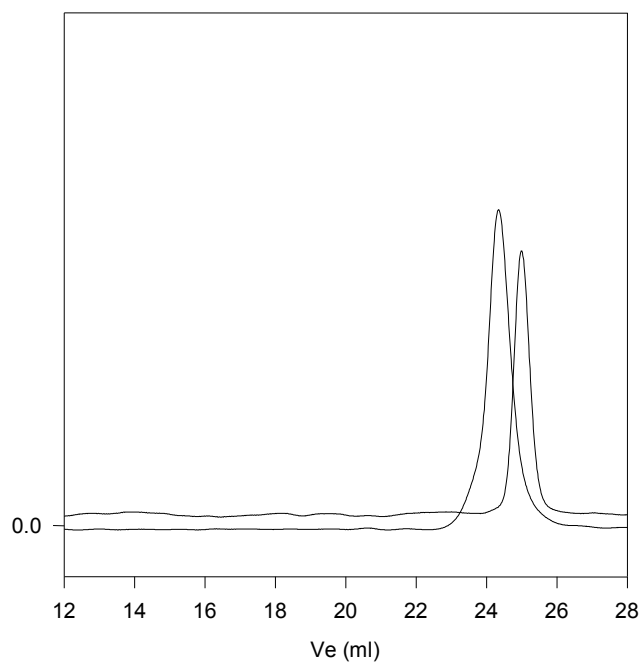
—— Poly(ethylene oxide), M_n=5000, M_w=5300, PI=1.05
Size exclusion chromatography:
—— Block Copolymer PEO(5000)-b-PCL(10000), PI=1.2

Thermal analysis of the sample# P8307-EOCL

Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of 20°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).
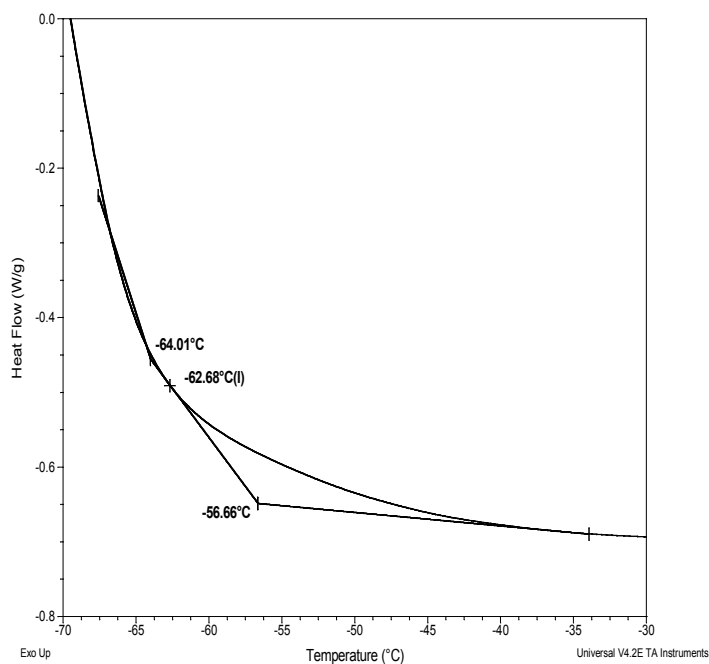
Melting and crystallization curve for the sample

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.
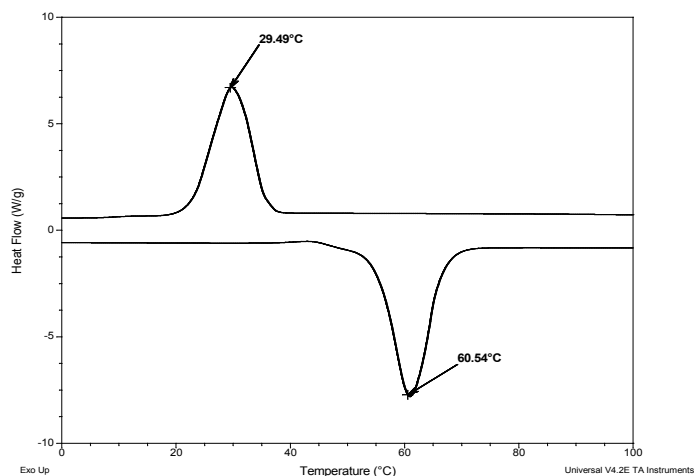
Thermal analysis results at a glance

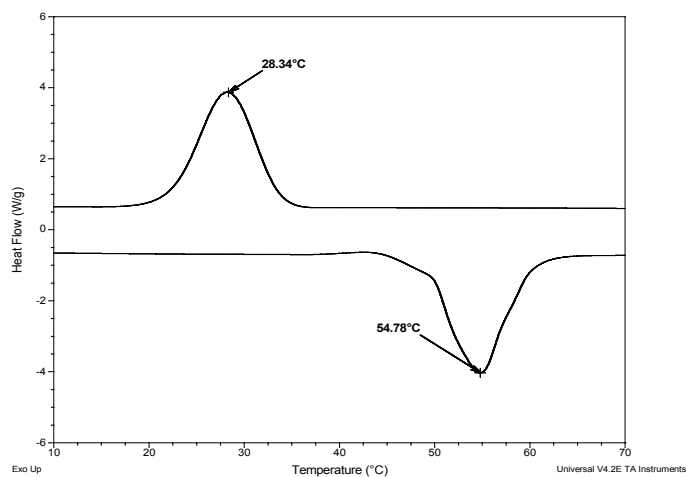| Sample	T_m (°C)	T_c (°C)	T_g (°C)
EO	61	29	-65
ε-CL	55	29	-69
EOCL	49 and 60	23	-63

Thermogram for the sample

Thermogram of poly (ethylene glycol) methyl ether (Mn≈5000)

Thermogram of ε-caprolactone (Mn≈8000)

Thermogram of #8307 EOCL sample