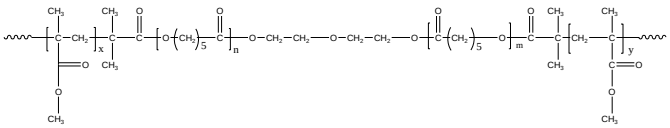
Sample Name:
Poly(methyl metharylate –b - ε--caprolactone –b- methyl methacrylate)

Sample #: P7125- MMACLMMA

Structure:



Composition:

Mn x 10^3 PMMA-b-PCL-b-PMMA	PDI
5.6-0.9-5.6	1.5

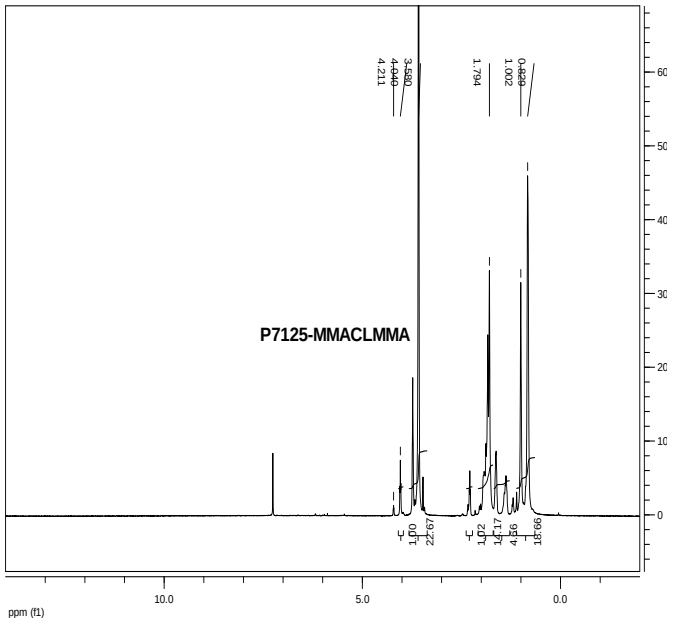
Synthesis Procedure:
Poly(methyl metharylate –b - ε-caprolactone) –b- methyl methacrylate) is prepared by ring opening polymerization of ε-caprolactone and coordination ATRP polymerization of methyl methacrylate.

Characterization:
The Mn of poly(ε-caprolactone) and poly(methyl metharylate –b - ε-caprolactone –b- methyl methacrylate) is calculated from ^{1}H-NMR spectroscopy by comparing the peak area of the ethylene oxide protons at about about 3.6 ppm, the ε-caprolactone protons at about 4.1 ppm and the methyl methacrylate protons at 1.9 ppm. The polydispersity index (PDI) is analyzed by size exclusion chromatography (SEC).

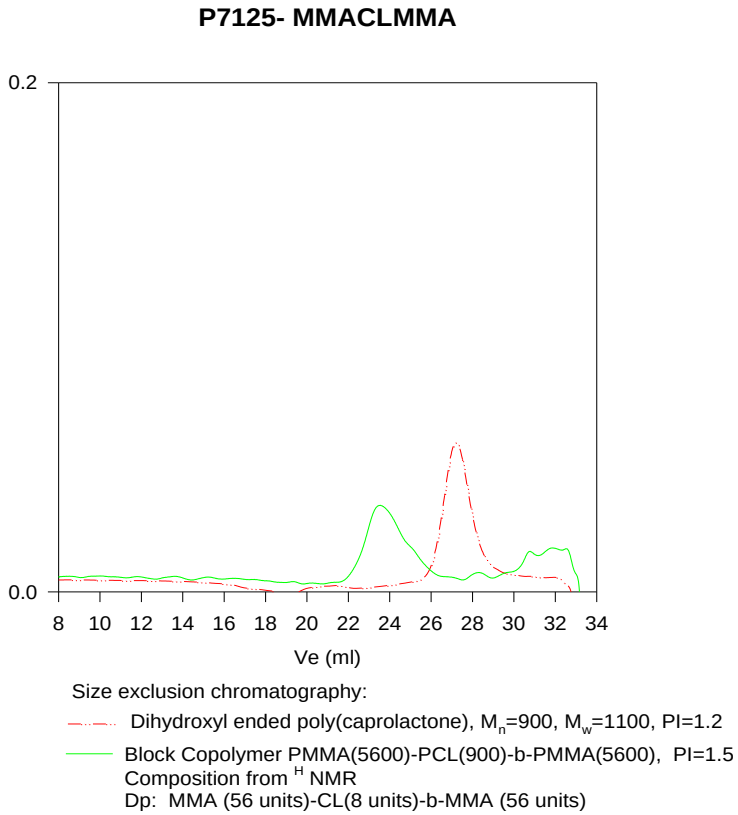
Thermal analysis:
Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of 10°C/min.The midpoint of the slope change of the heat flow plot of the second heating scan was considered as the glass transition temperature (T_g).

Solubility:
poly(methyl metharylate –b - ε-caprolactone –b- methyl methacrylate) 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:



Thermal analysis of the P7125 MMACLMMA sample

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).

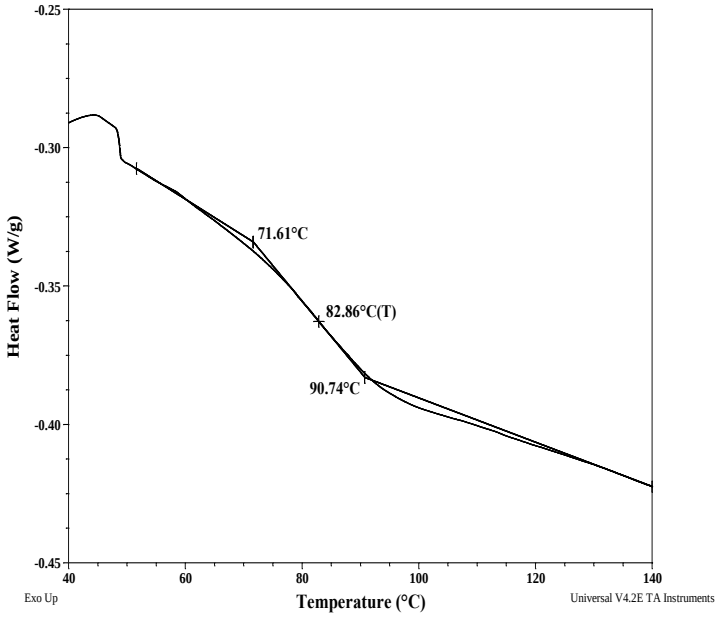
Melting and crystallization curve for the sample

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.

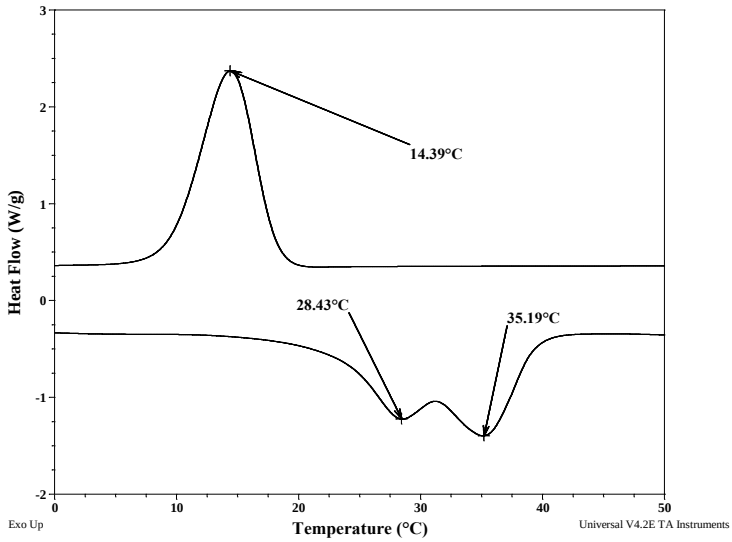
Typical thermal analysis results at a glance

Sample	T_m (°C)	T_c (°C)	T_g (°C)
MMA (Mn=9000)	-	-	107
MMA in triblock	-	-	83
ε-CL (Mn=900)	28 & 35	15	-64
CL in triblock	27 & 34	13	Not distinct

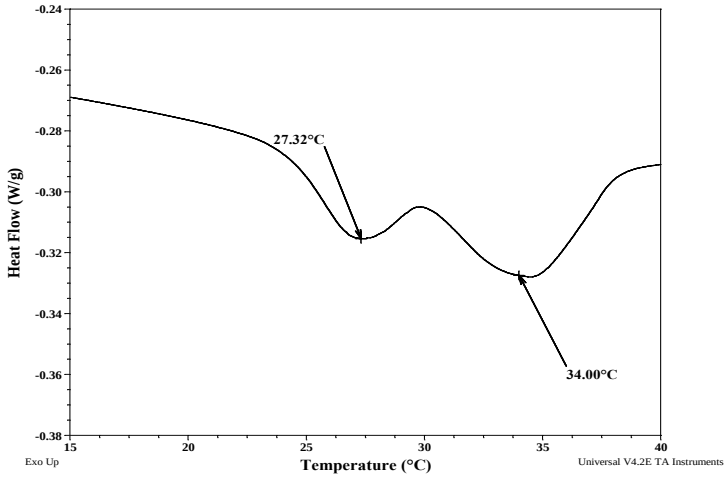
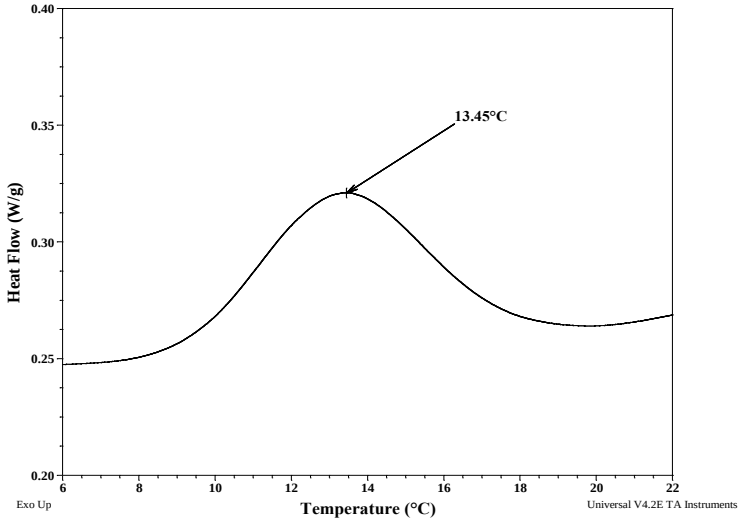
Thermogram for the MMA block in the triblock:



Thermogram of ε-caprolactone (Mn≈900)



Melting curve for CL block in triblock polymer:



Crystallization curve for CL block in the triblock: