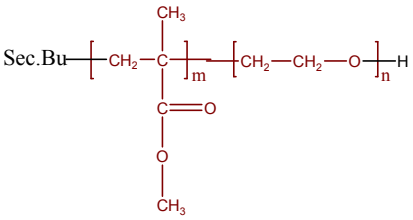
Sample Name:
Poly(methyl methacrylate –b- ethylene oxide)

Sample #: P11126B-EOMMA

Structure: This has structure A

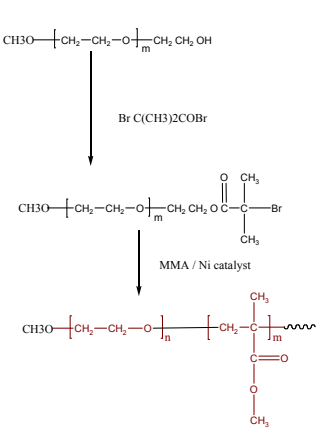


Composition:

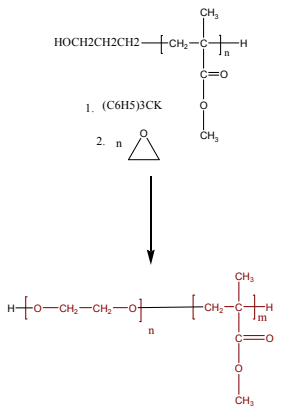
Mn x 10^3 PEO-b-MMA	PDI
11.0-b-59.0	1.6

Synthesis Procedure:

Poly(methyl methacrylate -b- ethylene oxide) is prepared by different routes. The scheme of the reactions are illustrated below:



Structure A



Structure-B

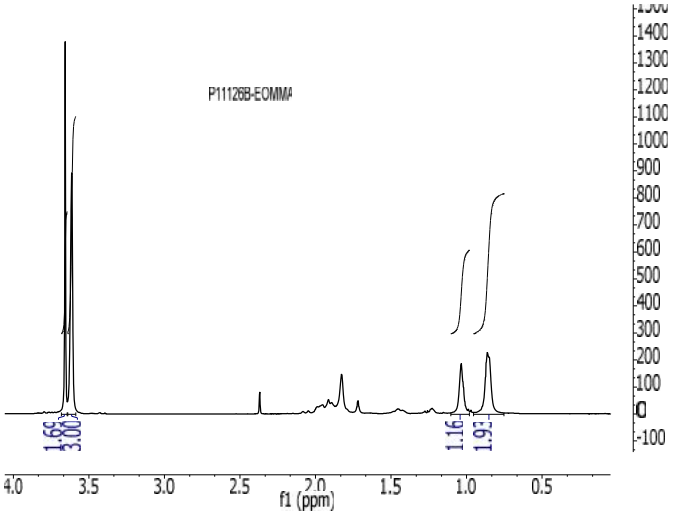
Purification of the polymer:

The non-reacting PEG from the synthesized polymer can be removed by stirring the polymer in hot water. The obtained polymer dissolved in $CHCl_3$/toluene and pass through the column packed with silica bed. The di-block copolymer obtained through second route where the macro-initiator of PEG bearing Br terminal group was used to initiate polymerization of the MMA. The obtained polymer solution in toluene/$CHCl_3$ was passed through a column packed with silica to remove the traces amount of Nickel catalyst. The polymer was further purified by stirring in hot water to remove un-reacted PEG macro-initiator and finally recovered by precipitation in cold ether/hexane mixture.

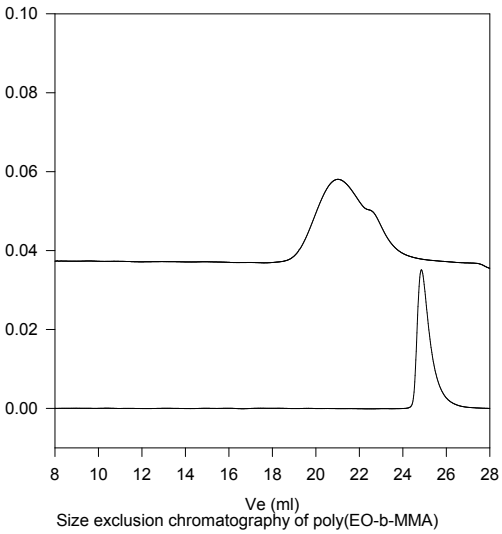
Characterization:

Solubility:
Poly(ethylene oxide -b- MMA) is soluble in CHCl3, THF, toluene. The polymer precipitated out from hexane.

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



SEC of the block copolymer:



Size exclusion chromatography of poly(EO-b-MMA)

PEO-Br M_n=11,000, M_w=12,000, Mw/Mn=1.10

Poly(ethylene glycol-b-Methylmethacrylate)
Mn: PEO(11000)-b-MMA(59,000) Mw/Mn=1.6
Composition from ^{H} NMR

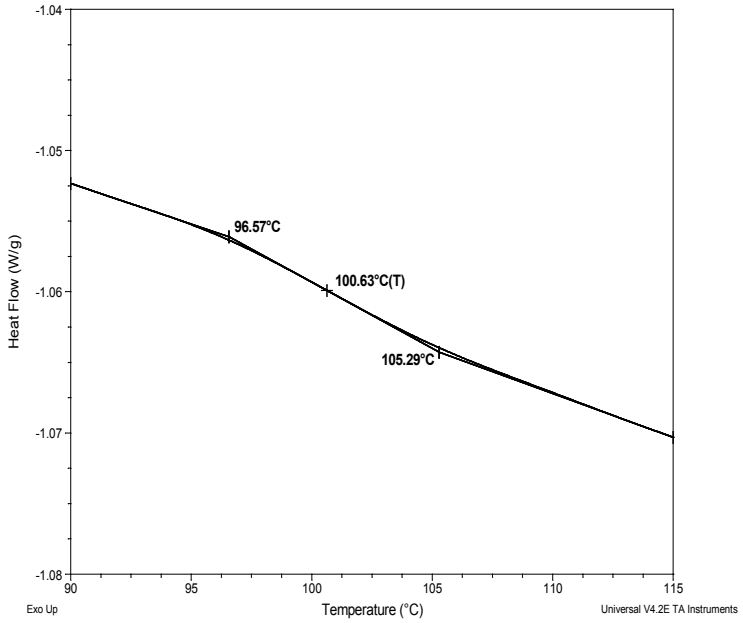
Thermal analysis of the sample# P11126B-EOMMA

Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of 20^{o}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).

Thermal analysis results at a glance

For PMMA block		
T_g: 101^{o}C	T_m: -	T_c: -
For PEO block		
T_g: -67 ^{o}C	T_m: 48^{o}C	T_c: Not observed

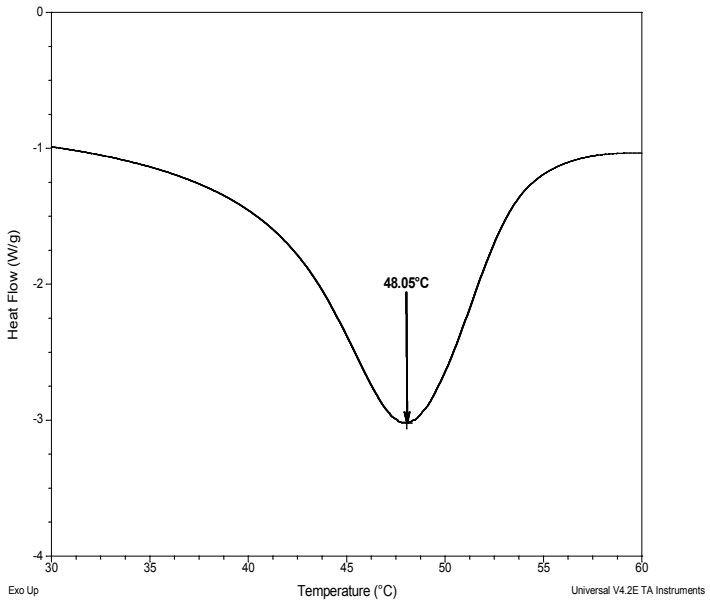
Thermogram for the MMA block



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.

Melting curve for PEO block



Thermogram for the PEO block