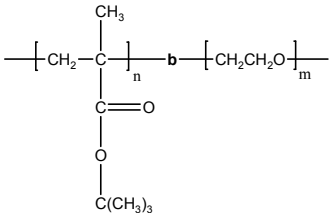
Sample Name:

Poly(t-butyl methacrylate -b- ethylene oxide)

Sample #: **P1871B-tBuMAEO**

Structure:

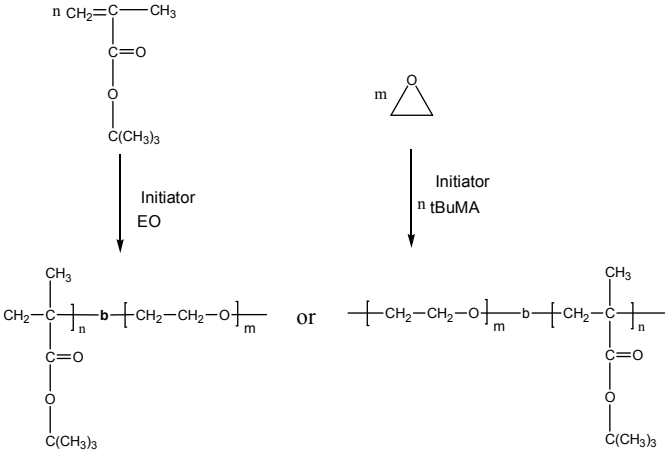


Composition:

Mn × 10^3 PtBuMA-b-PEO	PDI
1-b-7.5	1.12
T_g, T_m ,T_c for EO block: Not distinct	T_g for t-BuMA block: 94°C

Synthesis Procedure:

Poly(tert.butylmethacrylate-b-ethylene oxide) is prepared by 2 different routes: i). By living anionic polymerization of sequential addition of EO and tBuMA (ethylene oxide or t-butyl methacrylate) or ii) by chemical coupling reaction of the corresponding functionalized polymers. The scheme of the reaction is illustrated below:



Characterization:

An aliquot of the first anionic block was terminated before addition of monomer required to make the second block 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 t-butyl methacrylate protons at 1.43 ppm with the peak area of the ethylene oxide protons at 3.6 ppm. Copolymer PDI is determined by SEC.

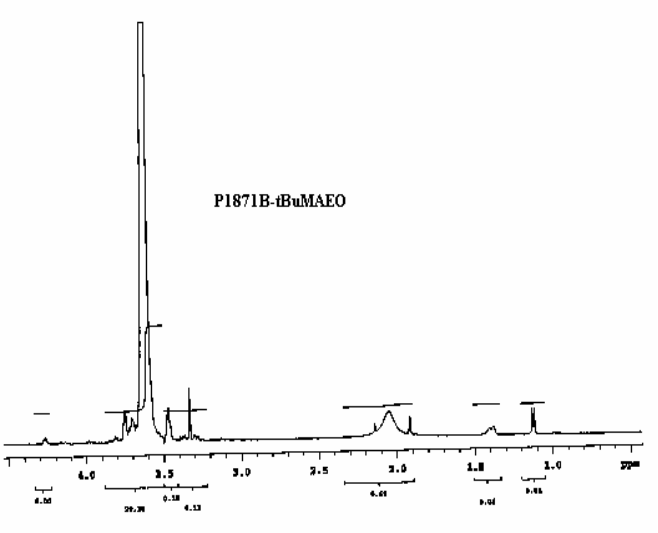
Thermal analysis:

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).

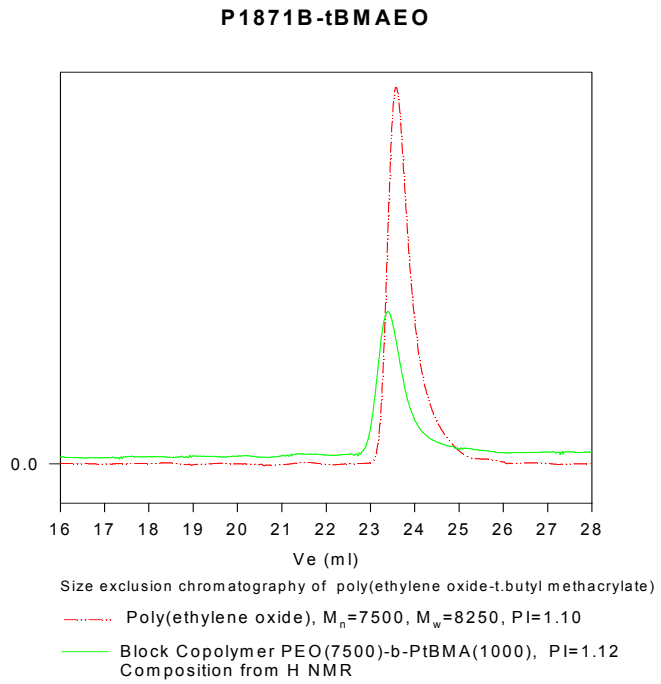
Solubility:

Poly(t-butylmethacrylate-b-ethylene oxide) is soluble in $CHCl_3$, methanol, THF and precipitated out from cold hexane or ether. It swells in water depending on the compositions.

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



SEC of the block copolymer:



References:

J. Wang, **S. K. Varshney**, J. Jerome and Ph. Teyssie "Synthesis of AB (BA) ABA and BAB Block copolymers of tert-butylmethacrylate (A) and ethylene oxide (B) " *CA Vol 117, 16, 151478, J. Polym. Sci., Part-A: Polym. Chem. Ed., 1992, 30, 2251-2261.*

Thermal analysis of the EOtBuMA-1871B

Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of 10^{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).

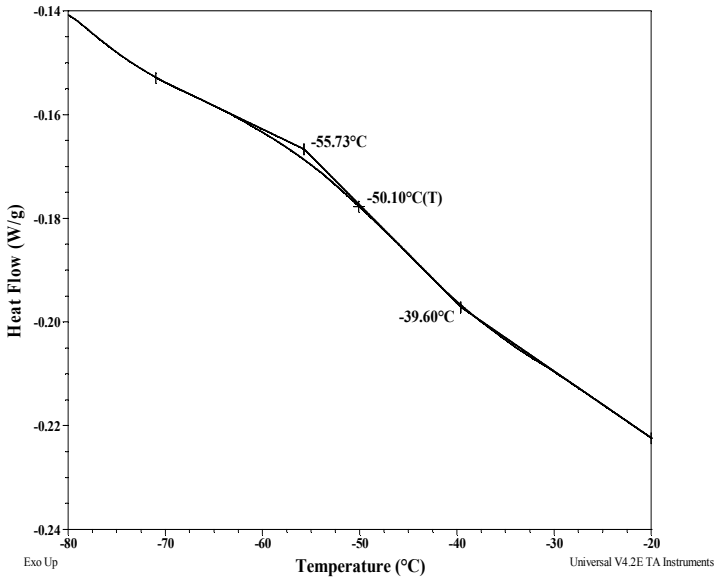
Melting and crystallization curve for the sample

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.

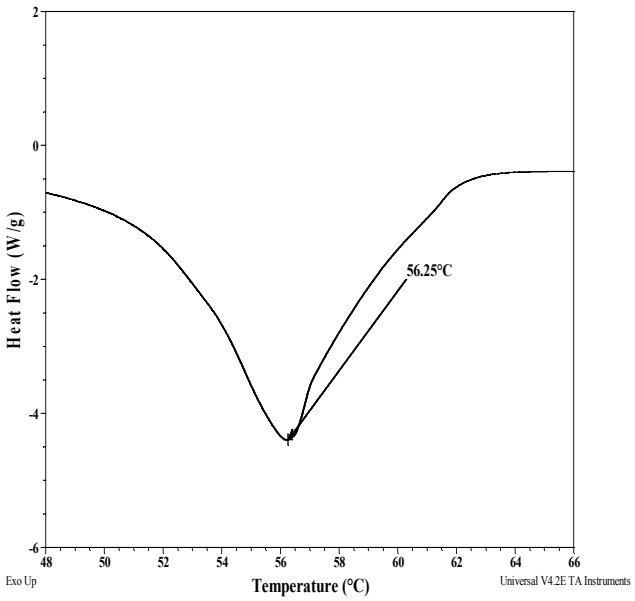
Thermal analysis results at a glance

Sample	T_m (^{o}C)	T_c (^{o}C)	T_g (^{o}C)
EO	56	34	-50
tBuMA	-	-	Not distinct

Thermogram for the PEO block



Melting curve for EO block:



Crystallization curve for EO block: