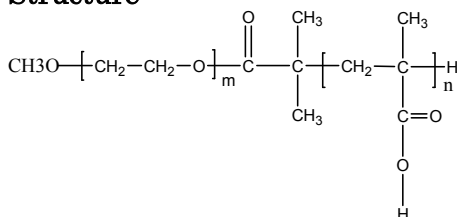


Sample Name: Poly(ethylene oxide -b- methacrylic acid)

Sample #: P6345-EOMAA

Structure:



Composition:

Mn x 10 ³ PEO-b-PtBMA	PDI
5.0-b-1.0	1.07

Synthesis Procedure:

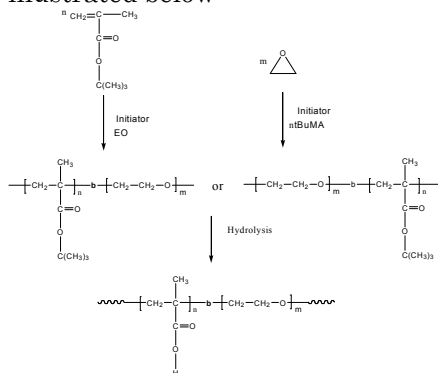
Poly(ethylene oxide -b- tert-butyl methylacrylate) is prepared by ATRP using bromo-terminated poly(ethylene glycol) as the macro-initiator.

Synthesis Procedure:

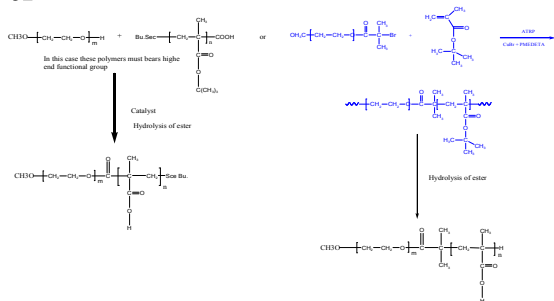
Poly(ethylene oxide -b- methacrylic acid) is prepared by 2 different routes:

A. By living anionic polymerization of sequential addition of EO and tBuMA (ethylene oxide or t-butyl methacrylate) followed by hydrolysis of the t-butyl group¹

B. by chemical coupling reaction of the corresponding functionalized polymer. The scheme of the reaction is illustrated below:



or



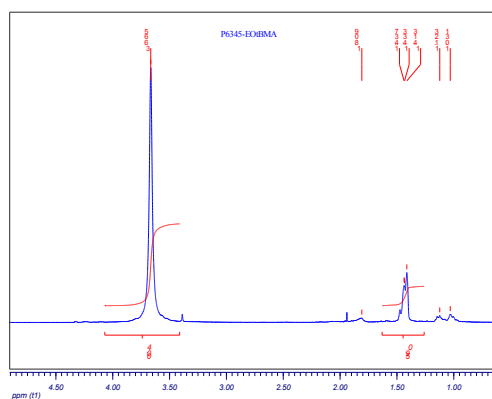
Characterization:

PEG-Br and final block copolymer were analyzed by size exclusion chromatography (SEC) to obtain the molecular weight of PEG and polydispersity index (PDI) for both PEG and block copolymer. The final block copolymer composition was calculated from ¹H-NMR spectroscopy by comparing the peak area of the ethylene oxide protons at about 3.6 ppm with the tert.butyl protons at about 1.4 ppm.

Solubility:

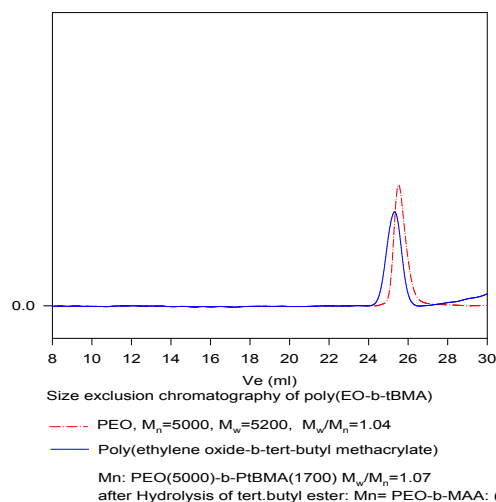
Poly(ethylene oxide -b- t-butyl methacrylate) is soluble in THF, acetone, and chloroform and it precipitates out in hexane if t-butyl methacrylate block is not that long.

¹H-NMR Spectrum of the block copolymer in ester form:



SEC of the block copolymer:

P6345-EOtBMA
Precursor for P6345-EOMAA



Thermal analysis of the P6345-EOMAA

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).

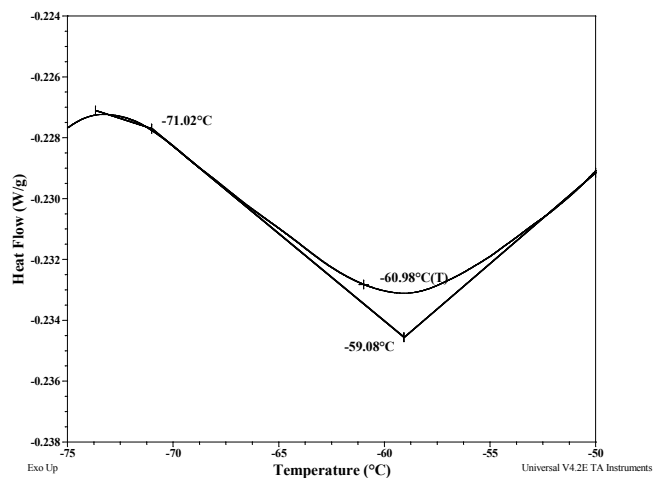
Melting and crystallization curve for the sample

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.

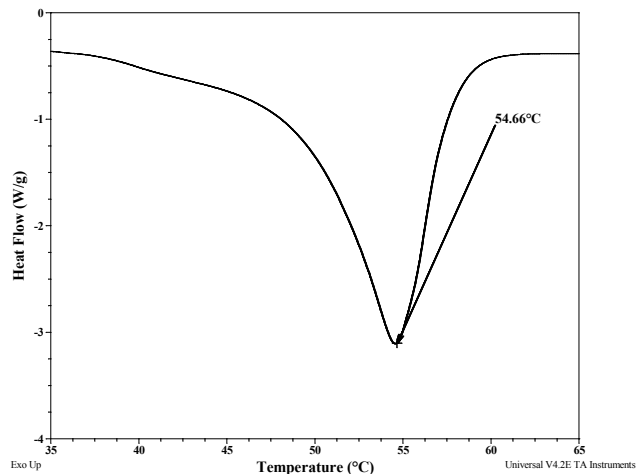
Thermal analysis results at a glance

Sample	T_m (°C)	T_c (°C)	T_g (°C)
EO Block	49	16	-61
AA block	-	-	Not distinct

Thermogram for the EO block:



Melting curve for the polymer:



Crystallization curve for EO block:

