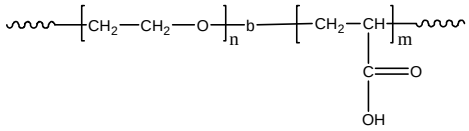
Sample Name:
Poly(ethylene oxide -b- acrylic acid)

Sample #: P11302B-EOAA

Structure:

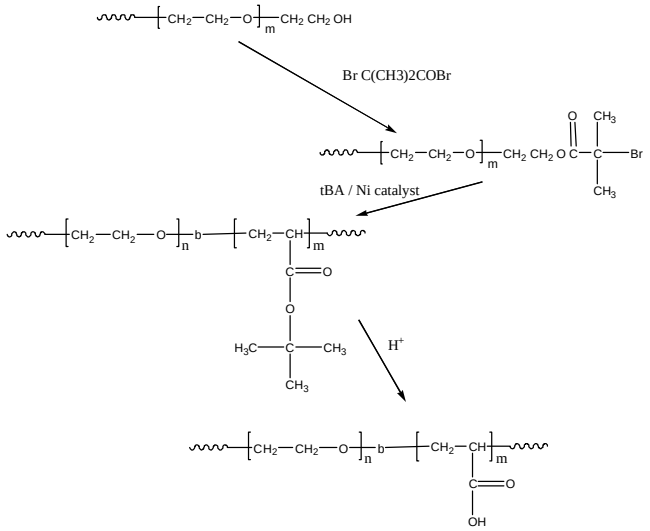


Composition:

Mn x 10^3 PEO-b-PAA	PDI
22.5-b-7.5	1.28

Synthesis Procedure:

The polymer was prepared as presented on the following scheme:



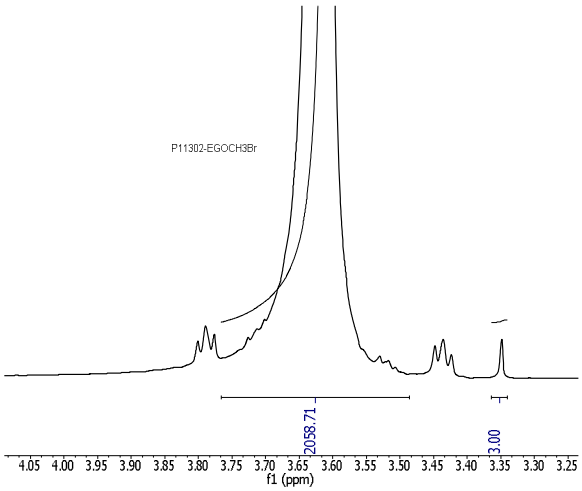
Characterization:

The final block copolymer composition was calculated from ^{1}H-NMR spectroscopy of poly(ethylene oxide -b- t-butyl acrylate) by comparing the peak area of the t-butyl acrylate protons at 1.43 ppm with the peak area of the ethylene oxide protons at 3.6 ppm, then transferred to the EOAA form accordingly. Copolymer PDI is determined by SEC of poly(ethylene oxide -b- t-butyl acrylate).

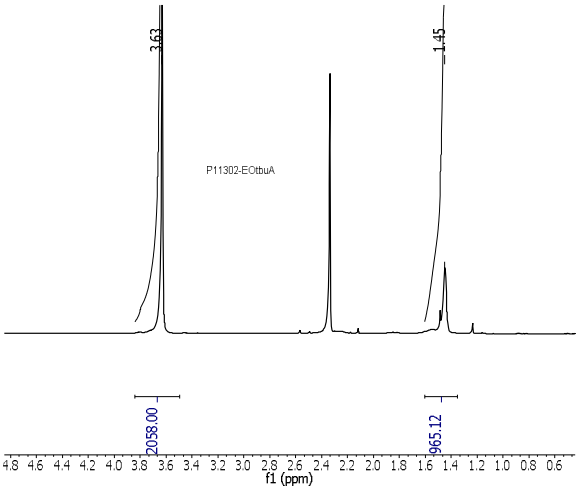
Solubility:

The polymer is soluble in water, methanol, THF and precipitated out from cold hexane or ether.

^{1}H-NMR spectrum of EG homopolymer (first block):

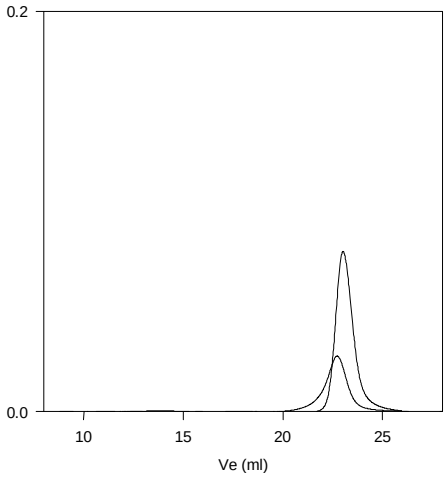


^{1}H-NMR spectrum of EO-tBuA block copolymer:



SEC of the block copolymer before hydrolysis:

P11302A-EOtBuA precursor for EOAA



Size exclusion chromatography of poly(ethylene oxide-t-butyl acrylate)
—— Poly(ethylene oxide), M_n=25,500, M_w=24,200, PI=1.07
—— Block Copolymer PEO(22,500)-b-PtBA(13,500 from NMR), PI=1.28
After Block Copolymer PEO(22,500)-b-PAA(7,500 from NMR), PI=1.28

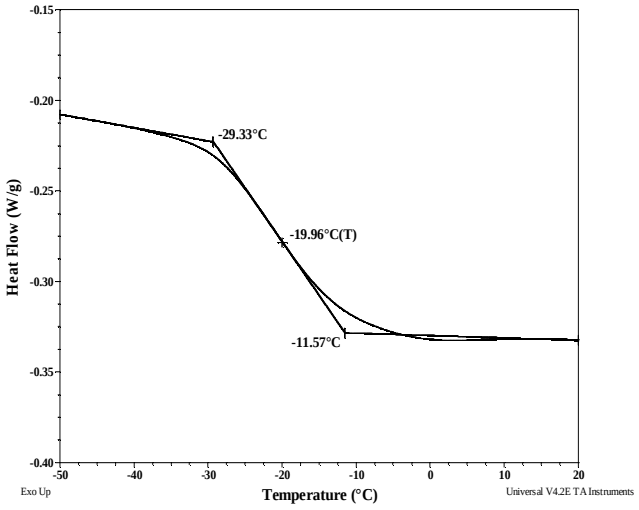
Thermal analysis of P11302B-EOAA:

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).
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.

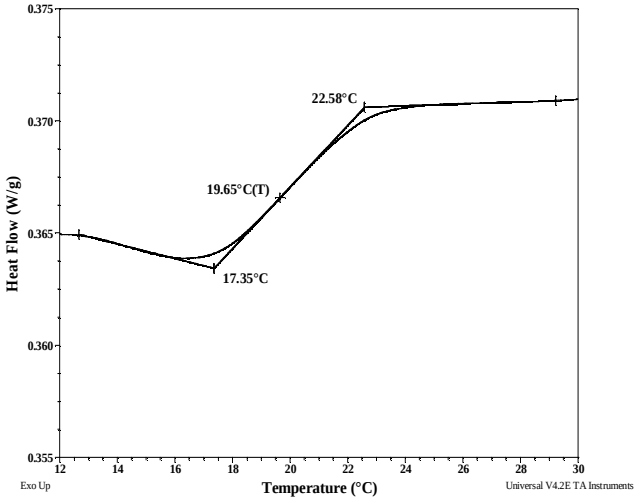
Summary of thermal analysis results for PEO-PAA:

Polymer	T_m (^{o}C)	T_c (^{o}C)	T_g (^{o}C)
PEO	47	-	-20
PAA			20

DSC thermogram for the PEO block:



DSC thermogram for PAA block:



Melting curve for PEO block: