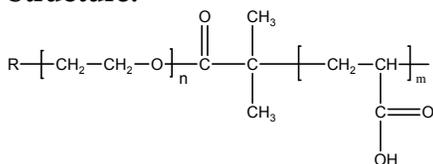


### Sample Name:

Poly(ethylene oxide -b- acrylic acid)

Sample #: P6348-EOAA

### Structure:

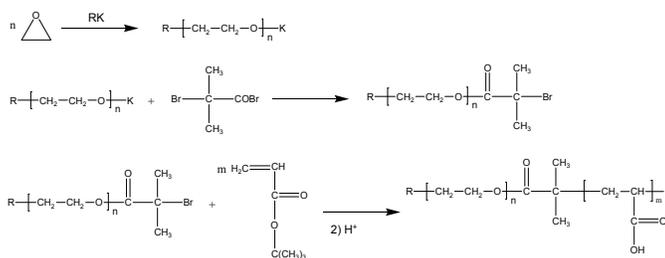


### Composition:

$M_n \times 10^3$ PEO-b-PAA	PDI
2.0-b-2.4	1.10

### Synthesis Procedure:

Poly(ethylene oxide -b- acrylic acid) is prepared by living anionic polymerization of ethylene oxide and controlled radical polymerization of-butyl acrylate followed by hydrolysis of the t-butyl group. The scheme of the reaction is illustrated below:



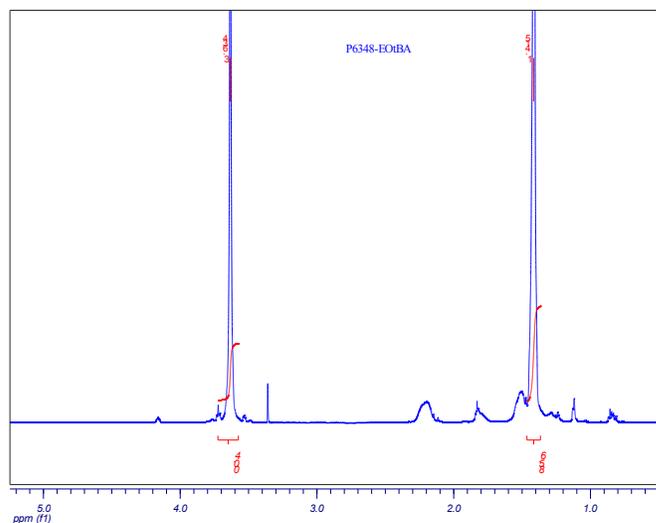
### Characterization:

An aliquot of the anionic poly(ethylene oxide) block was terminated before addition of t-butyl acrylate and analyzed by size exclusion chromatography (SEC) to obtain the molecular weight and polydispersity index (PDI). The final block copolymer composition was calculated from  $^1\text{H-NMR}$  spectroscopy by comparing the peak area of the ethylene oxide protons at about 3.6 ppm with the t-butyl protons (before hydrolysis) at about 1.43 ppm.

### Solubility:

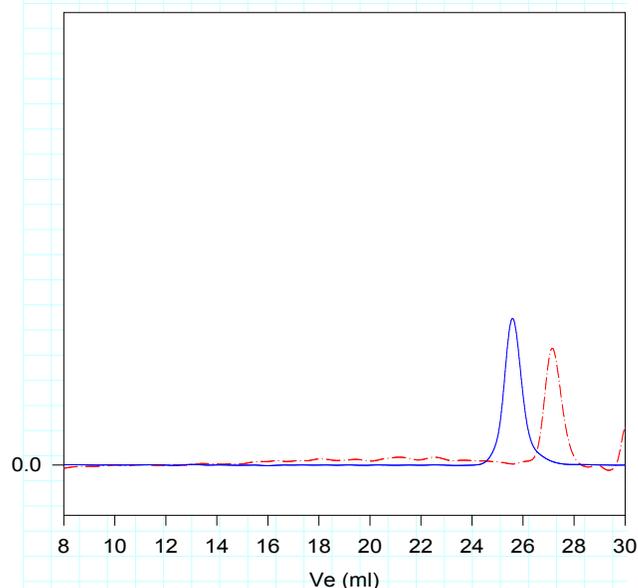
Poly(ethylene oxide -b- acrylic acid) is soluble in water and methanol. It precipitates from hexanes, ether and acetone, dependant on the composition.

### $^1\text{H-NMR}$ Spectrum of the block copolymer:



### SEC of the block copolymer:

**P6348-EOtBA**  
(Precursor of P6348-EOAA)



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

--- PEO,  $M_n=2000$ ,  $M_w=2100$ ,  $M_w/M_n=1.05$

— Poly(ethylene oxide-b-tert-butylacrylate)

$M_n$ : PEO(2000)-b-PtBA(4200)  $M_w/M_n=1.10$

After hydrolysis: PEO(2000)-b-PAA(2400)

## Thermal analysis of the P6348-EOAA

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 ( $T_g$ ).

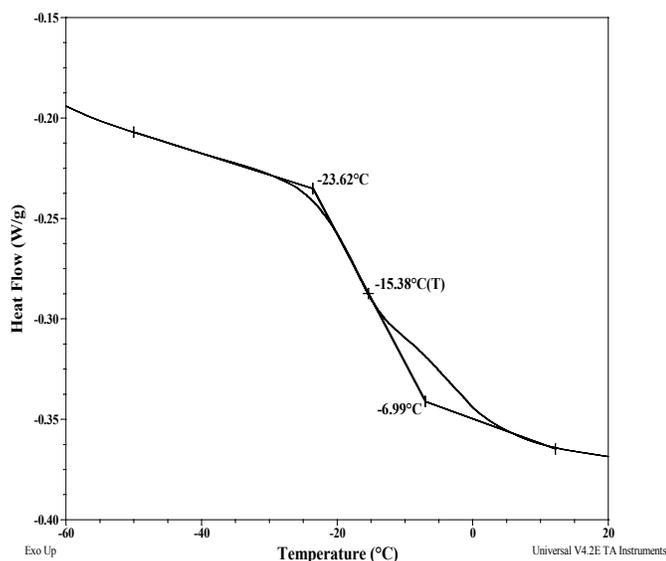
### Melting and crystallization curve for the sample

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.

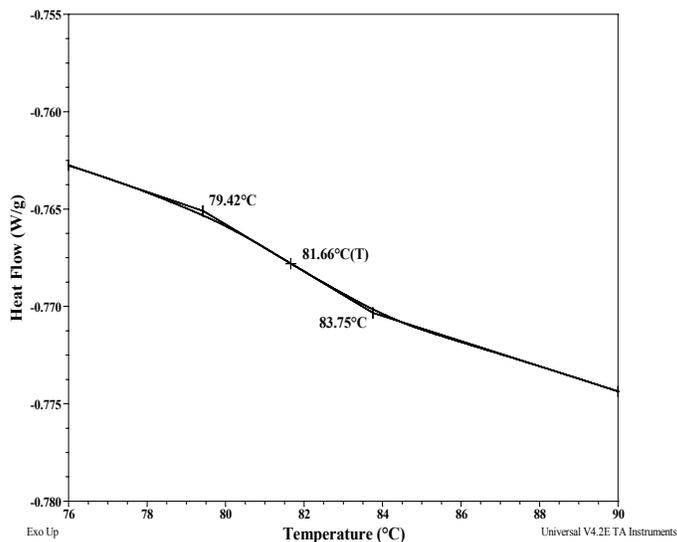
### Typical thermal analysis results at a glance:

Sample	$T_m$ (°C)	$T_c$ (°C)	$T_g$ (°C)
EO	48	-	-15
AA			82

### Typical thermogram for the EO block



### Thermogram for AA block:



### Melting curve for EO block:

