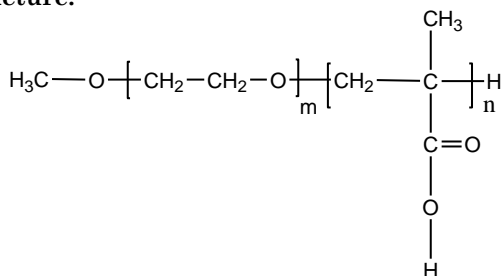


Sample Name: Poly(ethylene oxide -b- methacrylic acid)

Sample #: P20177-EOMAA

Structure:



Composition:

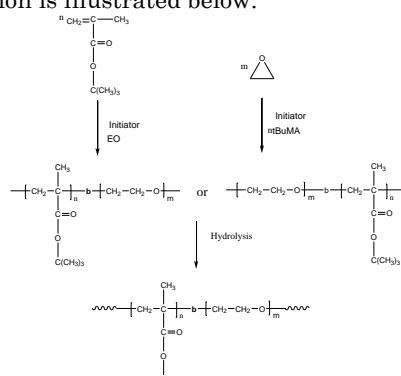
$\text{Mn} \times 10^3$ PEO-b-PMAA	PDI
7.5-b-18.0	1.4

Synthesis Procedure:

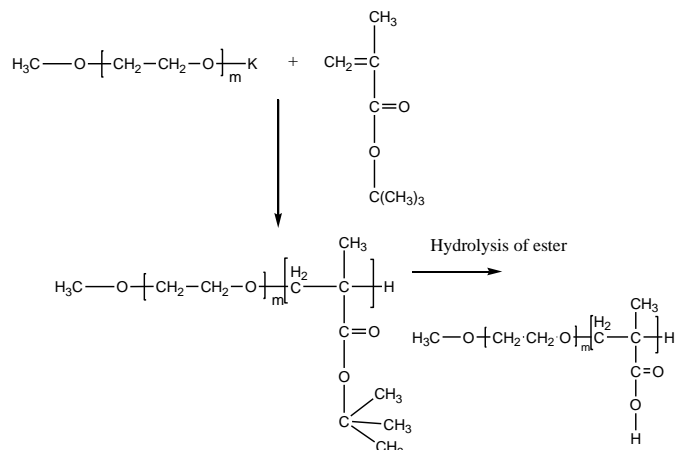
Poly(ethylene oxide -b- methacrylic acid) is prepared by 2 different routes:

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 group or

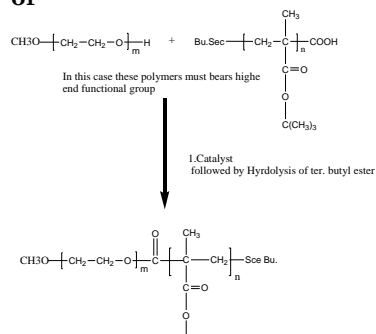
B. by chemical coupling reaction of the corresponding functionalized polymer. The scheme of the reaction is illustrated below:



or



or



Characterization:

An aliquot of the first anionic block was terminated before addition of 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 ^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.

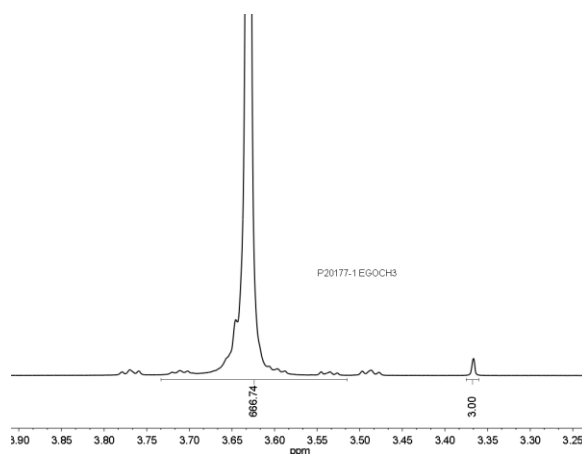
Hydrolysis:

To cleave the tert.butyl ester moiety the hydrolysis was carried out in dioxane using acid catalyst. The degree of hydrolysis was checked by FTIR the disappearance of characteristics at 1362cm^{-1} .

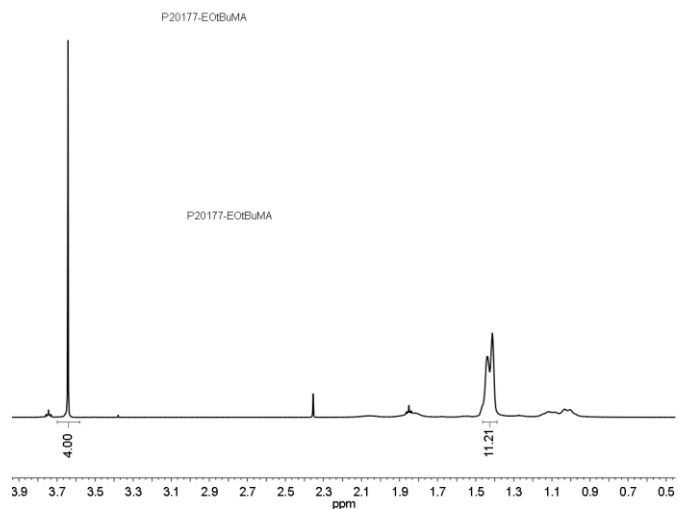
Solubility:

Poly(ethylene oxide -b- methacrylic acid) is soluble in water, THF, methanol, ethanol and precipitate out in hexane, ether.

^1H NMR of PEG



¹H NMR of EOMAA in Methanol



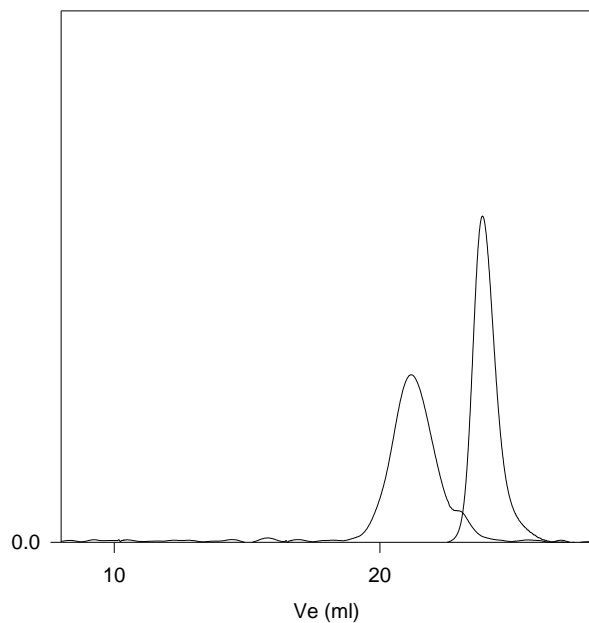
References:

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.*

SEC of the block copolymer:

P20177-EOtBuMA



Size exclusion chromatography of poly(ethylene oxide-*t*-butyl methacrylate)

- Poly(ethylene oxide), $M_n=7500$, $M_w=8250$, $PI=1.10$
 - Block Copolymer PEO(7500)-*b*-PtBMA(29,500), $PI=1.4$
- Composition from H NMR
after Hydrolysis of tert. butyl ester:
Mn: PEO-*b*-MAA 7500-*b*-18,000