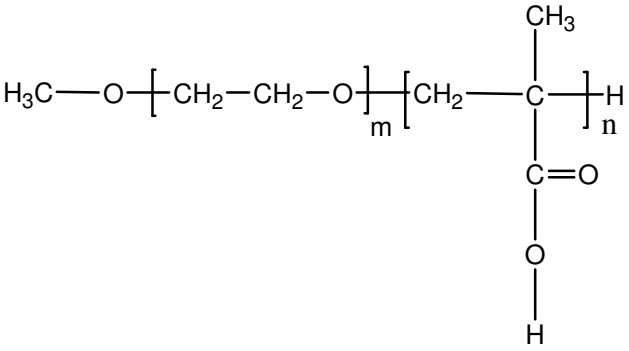
Sample Name: **Poly(ethylene oxide -b- methacrylic acid)**
Sample #: **P20178-EOMAA**

Structure:



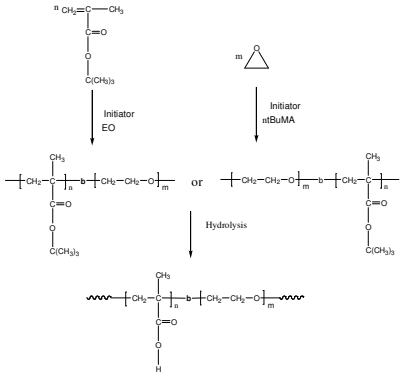
Composition:

Mn × 10^3 PEO-b-PMAA	PDI
7.5-b-15.0	1.35

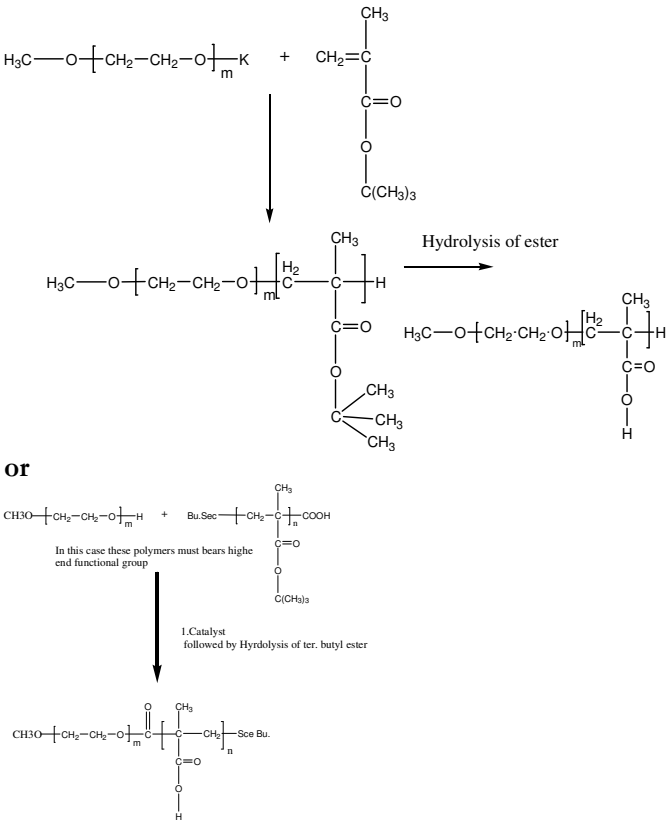
Synthesis Procedure:
Poly(ethylene oxide -b- methylacrylic acid) is prepared by 2 different routes:

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

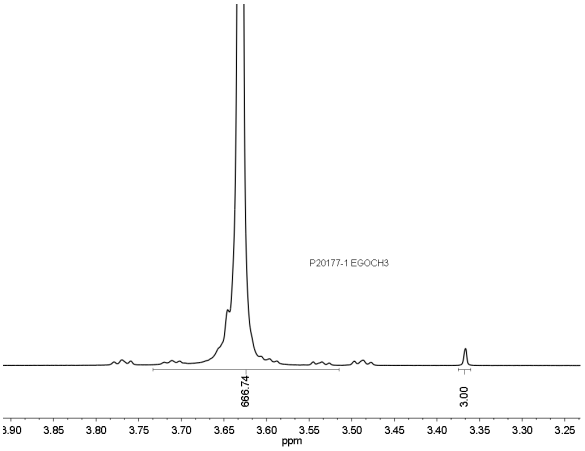


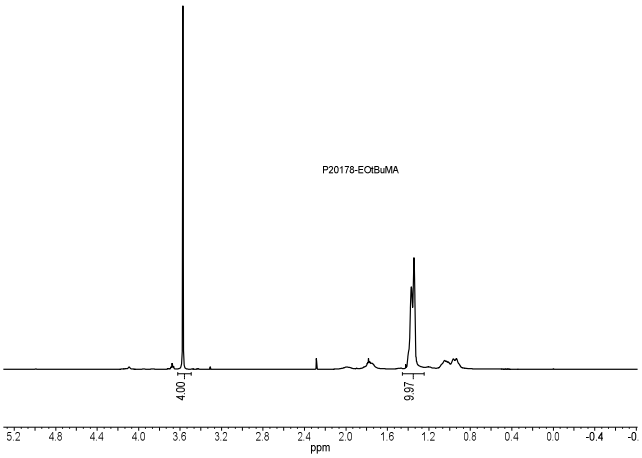
Characterization:
An aliquot of the first anionic block was terminated before addition of the second block and analyzed by size exclusion chromatography (SEC) to obtain the molecular weight and polydispersity index (PDI). The final block copolymer composition was calculated from ^{1}H-NMR spectroscopy by comparing the peak area of the ethylene oxide protons at about 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 disapperance of characteristics at 1362cm^{-1}.

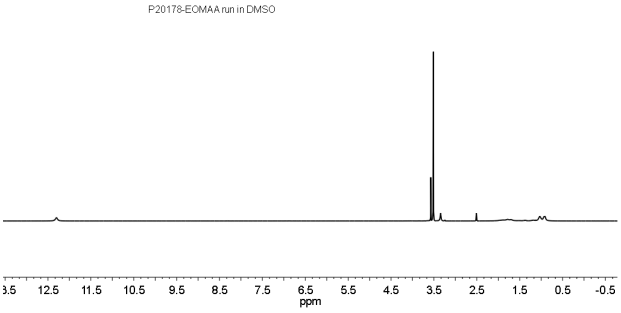
Solubility:
Poly(ethylene oxide -b- methacrylic acid) is soluble in water, THF, methanol, ethanol and precipitate out in hexane, ether.

^{1}H NMR of PEG





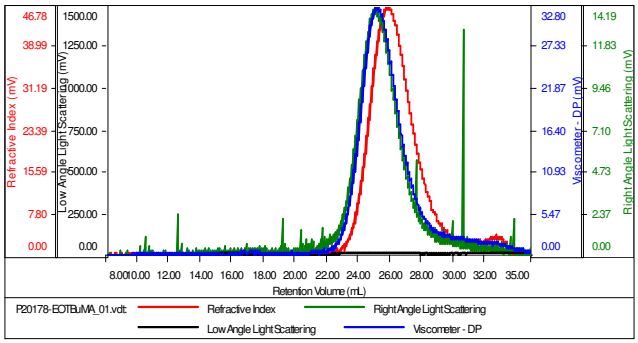
^{1}H NMR of EOMAA in Methanol



SEC:

Sample ID: P20178-EOtBuMA

Concentration (mg/mL)	4.9919
Sample dn/dc (mL/g)	0.0800
Method File	PS80K-Jan22-2015-0003.vcm
Column Set	3x PL 1113-6300
Solvent	THF



Sample	MW Number Average (Da)	MW Weight Average (Da)	MW at Peak (Da)	Polydispersit	Intrinsic Viscosity (dL/g)
P20178-EOTBuMA_01.vdt	33,473	45,128	40,610	1.348	0.3940

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.*