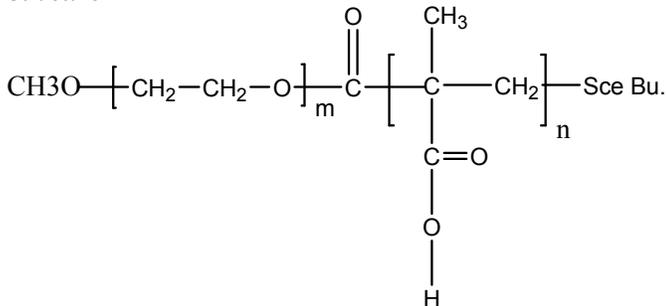


**Sample Name:** Poly(ethylene oxide -b- methacrylic acid)

**Sample #:** P8137-EOMAA

**Structure:**



**Composition:**

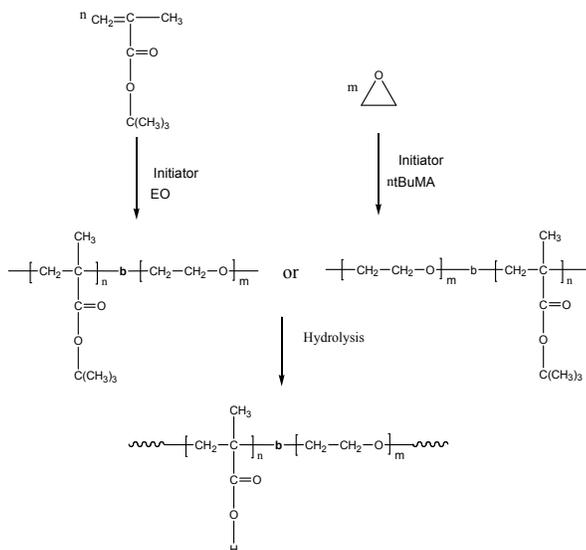
Mn x 10 <sup>3</sup> PEO-b-PMAA	PDI
2.0-b-3.5	1.2

**Synthesis Procedure:**

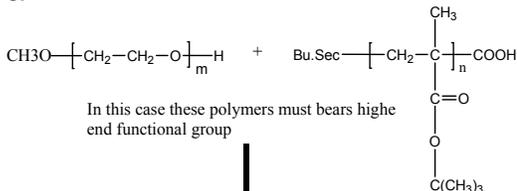
Poly(ethylene oxide -b- methylacrylic acid) is prepared by 2 different routes:

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<sup>1</sup> or

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

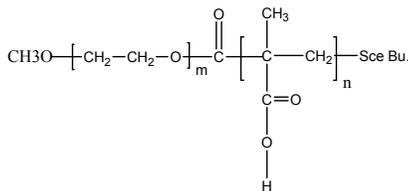


**or**



In this case these polymers must bears high end functional group

1. Catalyst followed by Hydrolysis of ter. butyl ester



**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 <sup>1</sup>H-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:**

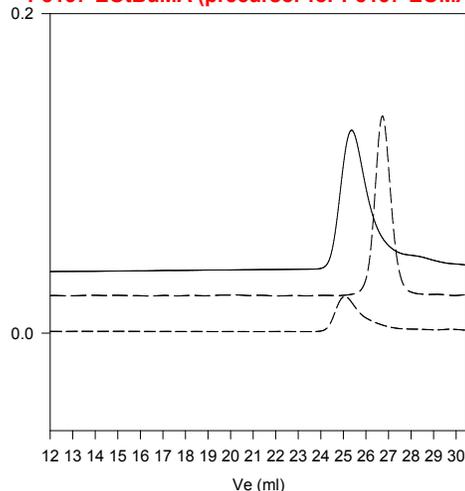
To cleave the tert.butyl ester moiety the hydrolysis was carried out in dioxane using acid catalyst. The degree of hydrolysis was checked by FTIR the disappearance of characteristics at 1362cm<sup>-1</sup>.

**Solubility:**

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

**SEC of the block copolymer:**

**P8137-EOtBuMA (precursor for P8137-EOMAA)**



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

--- COOH terminated Poly(tert.butylmethacrylate), M<sub>n</sub>=6000 M<sub>w</sub>=6800, PI=1.15

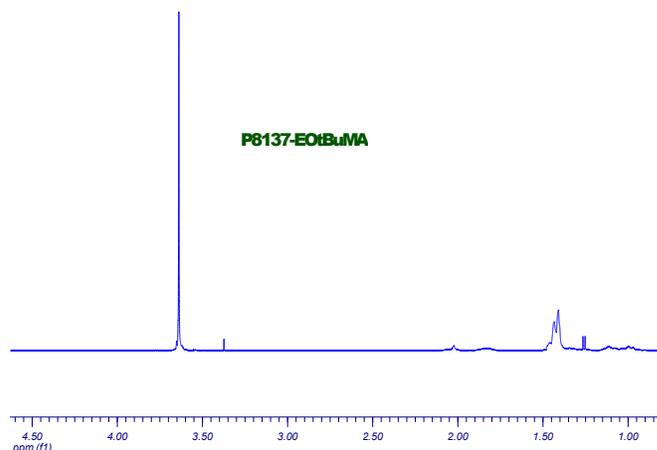
— Poly ethylene glycol methylether: Mn 2000 Mw: 3000 PI=1.05

--- After the linking reaction:

Poly (Ethylene oxide-b-tert. Butyl methacrylate):  
Mn 2000-b-6000 PI=1.20

After Hydrolysis of the tert.butyl ester:

PEO-b-MAA : Mn: 2000-b-3500 Mw/Mn 1.20



**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.*