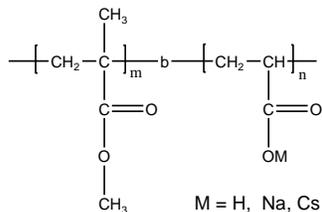


Sample Name: Poly(methyl methacrylate-*b*-acrylic acid)

Sample #: P8254A-MMAAA

Structure:

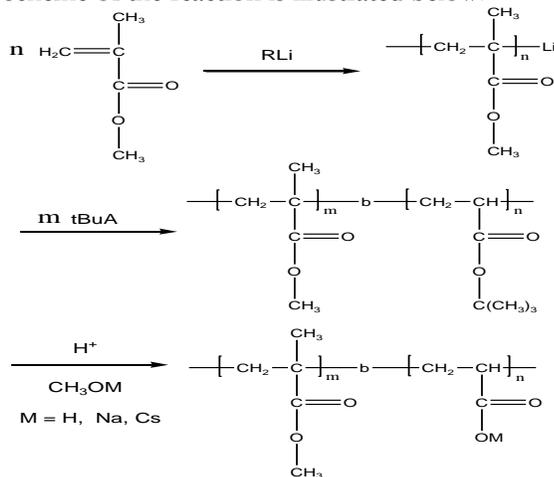


Composition:

$M_n \times 10^3$ PMMA- <i>b</i> -PAA	PDI
34.0- <i>b</i> -20.0	1.15
T_g for MMA: 133°C	T_g for PAA: 146°C

Synthesis Procedure:

Poly(methyl methacrylate -*b*- acrylic acid) is prepared by living anionic polymerization with sequence addition of methyl methacrylate followed by *t*-butyl acrylate or vice versa and hydrolysis of the *t*-butyl group. The scheme of the reaction is illustrated below:



Characterization:

An aliquot of the anionic poly(methyl methacrylate) 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 ¹H-NMR spectroscopy by comparing the peak area of the *t*-butyl methacrylate protons at 1.43 ppm with the peak area of the methyl methacrylate protons at 3.6 ppm. Copolymer PDI is determined by SEC.

Thermal analysis

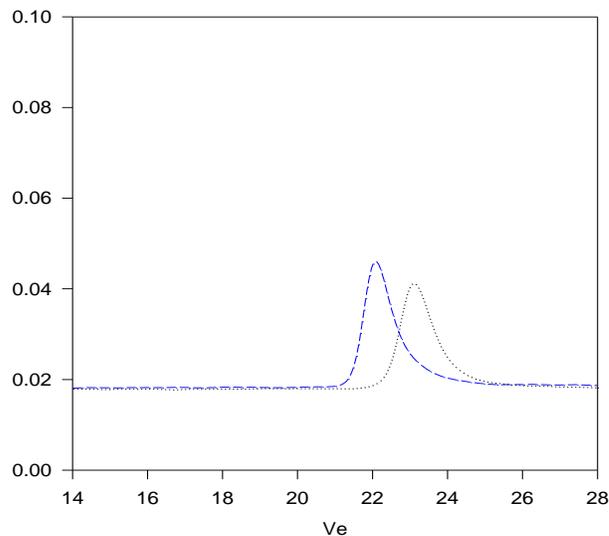
Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of 10°C/min. The midpoint of the slope change of the heat flow plot of the second heating scan was considered as the glass transition temperature (T_g).

Solubility:

Poly(methyl methacrylate -*b*- acrylic acid) is soluble in methanol depending on the compositions. It is precipitated out from ether and hexane.

SEC of the block copolymer:

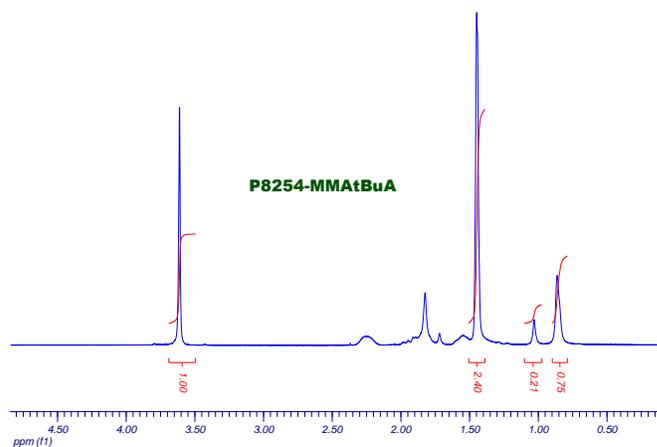
P8254-MMA*t*BuA Precursor for P8254A-MMAAA



Size Exclusion Chromatography :

- Poly *tert*.butylacrylate, $M_n = 35000$ $M_w/M_n = 1.12$
- Block Copolymer PMMA(34000)-*t*BuA(35000), $M_w/M_n = 1.15$
After Hydrolysis of *tert*. butyl ester: PMMA-*b*-AA:34000-*b*-20000

NMR of the block copolymer:



DSC thermogram for MMA and PAA:

