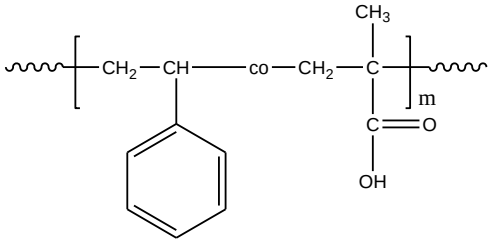
Sample Name:
Random Copolymer Poly(styrene-co-methacrylic acid)
Sample #: P7415-SMAAran
Structure:



Composition:
PS (mol%) : 82

Mn x 10^3 PS-co-PMAA	PDI
2.0	1.7
T_g for the random copolymer	109°C

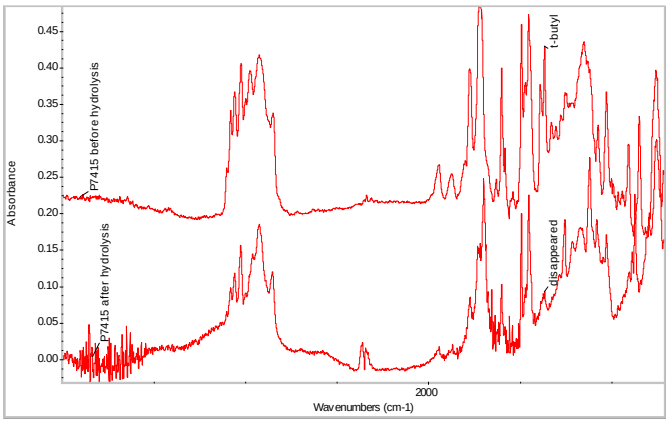
Synthesis Procedure:
The polymer is prepared by ATRP of styrene and t-butyl methacrylate, followed by hydrolyzing the poly(styrene-co-t-butyl methacrylate), and then processed by sodium bicarbonate.

Characterization:
The molecular weight and polydispersity index (PDI) were calculated from the starting polymer poly(styrene-co-t-butyl methacrylate) based on GPC. The copolymer composition was calculated from ^{1}H-NMR spectroscopy by comparing the peak area the aromatic protons of styrene at about 6.66-7.05 ppm with the protons of t-butyl methacrylate at about 0.8-2.5 ppm that deducts the contribution of the styrene back bone protons according to the poly(styrene-co-t-butyl methacrylate).

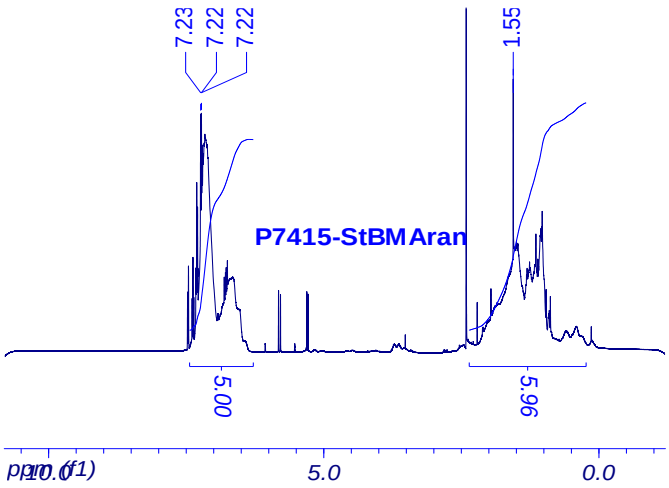
Thermal analysis:
Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of 10°C/min.The midpoint of the slope change of the heat flow plot of the second heating scan was considered as the glass transition temperature (T_g).

Solubility:
The polymer is soluble in acetone, insoluble in ether , hexane.

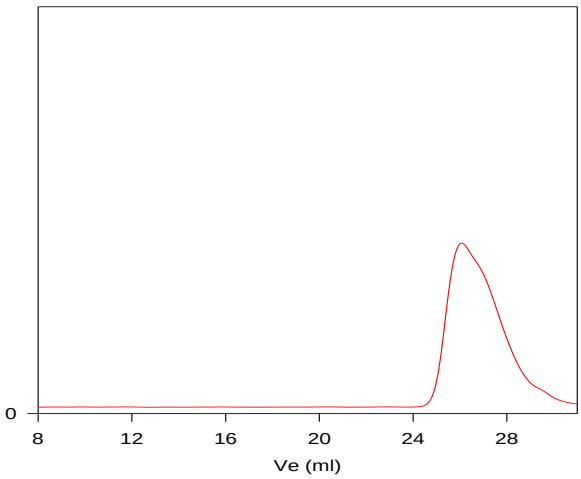
FTIR of the copolymer before and after hydrolysis:



^{1}H-NMR Spectrum of the random copolymer before hydrolysis:



SEC of the random copolymer before hydrolysis:



Size exclusion chromatograph of random copolymer: poly(S-co-tBuMA):
M_n=2100, M_w=3600, M_w/M_n=1.7
Polystyrene content: 82%mol by NMR

after hydrolysis, the poly(Styrene-co-methacrylic acid)
Mn: 2000 Mw: 3400 PDI: 1.7
Polystyrene content: 82%mol

DSC thermogram for the sample: