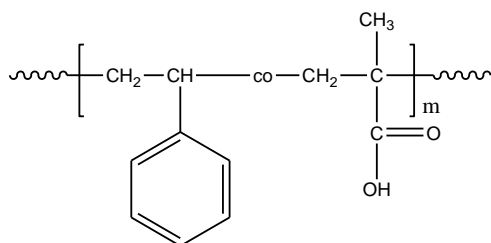


**Sample Name:**

Random Copolymer Poly(styrene-co-methacrylic acid)

**Sample #:** P7413-SMAAran

**Structure:****Composition:**

PS (mol%) : 65

$M_n \times 10^3$ PS-co-PMAA	PDI
4.3	1.4
$T_g$ for the random copolymer	119°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:**

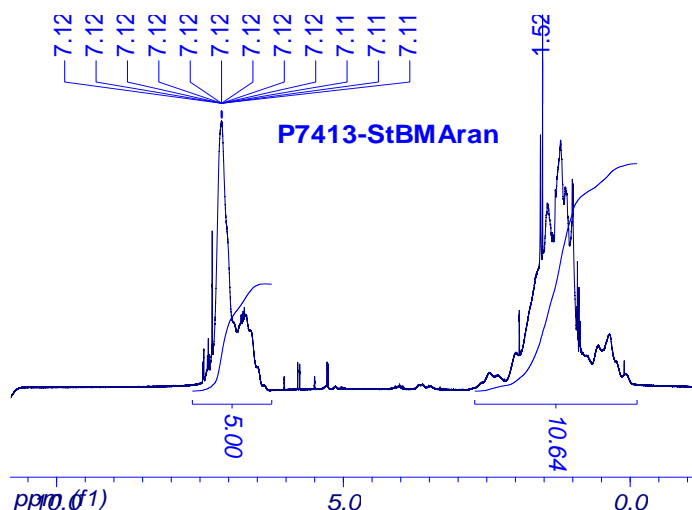
The molecular weight and polydispersity index (PDI) were calculated from the starting polymer poly(styrene-co-t-butyl methacrylate) based on GPC. The copolymer composition was calculated from  $^1\text{H-NMR}$  spectroscopy by comparing the peak area the aromatic protons of styrene at about 6.66-7.05 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:**

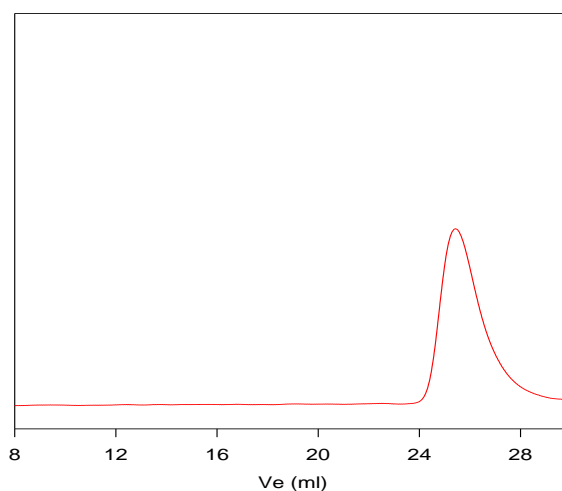
Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of 10°C/min. The midpoint of the slope change of the heat flow plot of the second heating scan was considered as the glass transition temperature ( $T_g$ ).

**Solubility:**

The polymer is soluble in acetone, insoluble in ether and hexane.

 **$^1\text{H-NMR}$  Spectrum of the random copolymer before hydrolysis:****SEC of the random copolymer before hydrolysis:**

P7413-StBuMAran



Size exclusion chromatograph of random copolymer: poly(S-co-tBuMA):

$M_n=4900$ ,  $M_w=6900$ ,  $M_w/M_n=1.4$

Polystyrene content: 65%mol by NMR

after hydrolysis, the poly(Styrene-co-methacrylic acid)

$M_n$ : 4300  $M_w$ : 6000 PDI: 1.4

Polystyrene content: 65%mol

**DSC thermogram for the sample:**