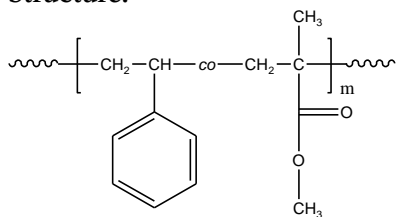


Sample Name:

Random Copolymer Poly(styrene-co-methyl methacrylate)

Sample #: P9220A-SMMAran

Structure:



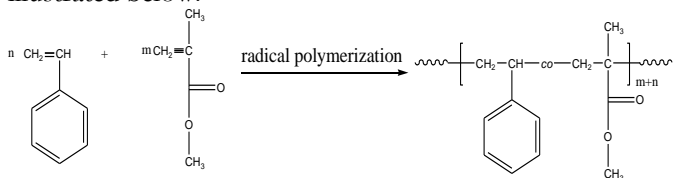
Composition:

Poly styrene: (mol%) : 39.0

| $M_n \times 10^3$ PS-co-PMMA | PDI |
|---------------------------------|------|
| 16.4 | 1.22 |
| T_g ($^{\circ}\text{C}$) | 89 |

Synthesis Procedure:

Random Copolymer Poly(styrene-co-methyl methacrylate) is prepared by radical polymerization of styrene and methyl methacrylate. The scheme of the reaction is illustrated below:



Characterization:

The polymer was analyzed by size exclusion chromatography (SEC) to obtain the molecular weight and polydispersity index (PDI). The copolymer composition was calculated from $^1\text{H-NMR}$ spectroscopy by comparing the peak area the aromatic protons of 6.66-7.05 ppm with the protons of methyl methacrylate at about 0.8-3.8 ppm that deducts the contribution of the styrene back bone protons.

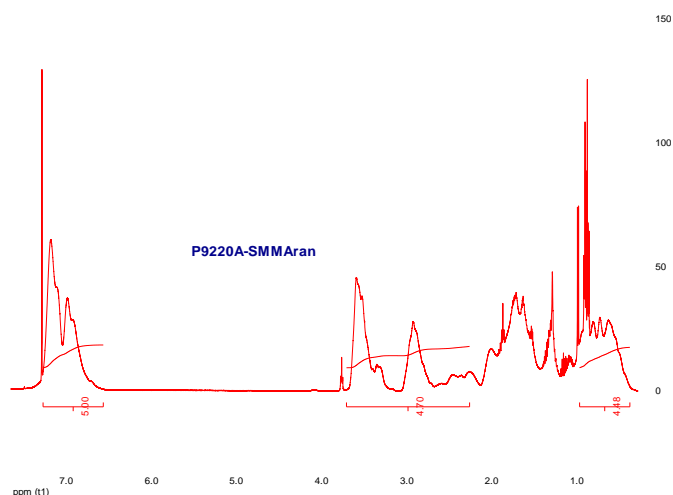
Thermal analysis:

Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of $10^{\circ}\text{C}/\text{min}$. 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:

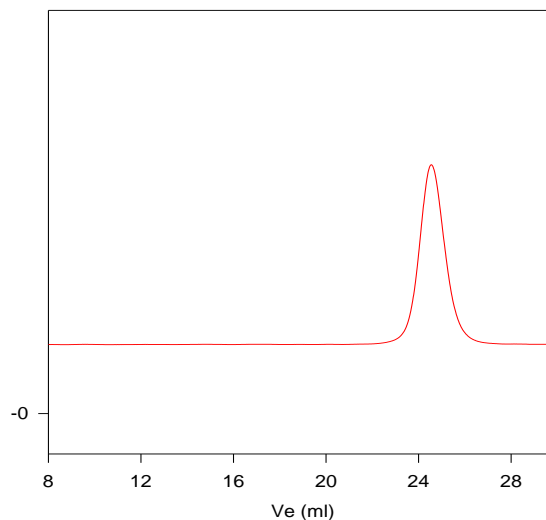
Random Copolymer Poly(styrene-co-methyl methacrylate) is soluble in CHCl_3 , THF, DMF, toluene and precipitated out from methanol.

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



SEC of the random copolymer:

P9220A-SMMAran



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

$M_n=16,400$, $M_w=20,000$, $M_w/M_n=1.22$

Polystyrene content: 39 mole% by NMR

DSC thermogram for random polymer:

