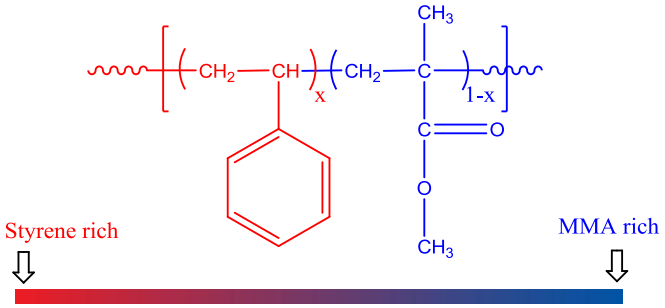
Sample Name:
Gradient Random Copolymer Poly(styrene-co-methyl methacrylate)

Sample #: P6570-SMMAgra

Structure:



Composition:

Mn x 10^3 (Styrene wt%)	PDI
140.0 (24.6%)	1.42
40% St → 10% St	Overall 24.6% St

Synthesis Procedure:

Random Copolymer is prepared by ATRP of styrene, and methyl methacrylate with several times feeding monomer to adjust the gradient composition.

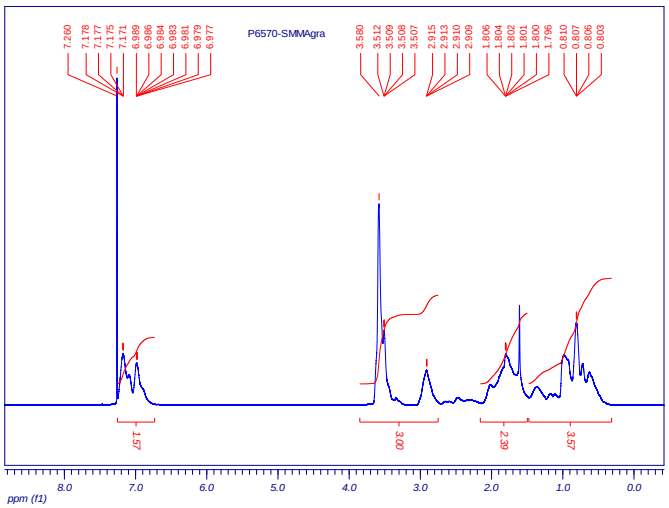
Characterization:

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}H-NMR spectroscopy by comparing the peak area the aromatic protons of 6.66-7.05 ppm with the protons of ester of MMA at about 3.5-3.6 ppm. The gradient composition was checked by pick out samples during the polymerization.

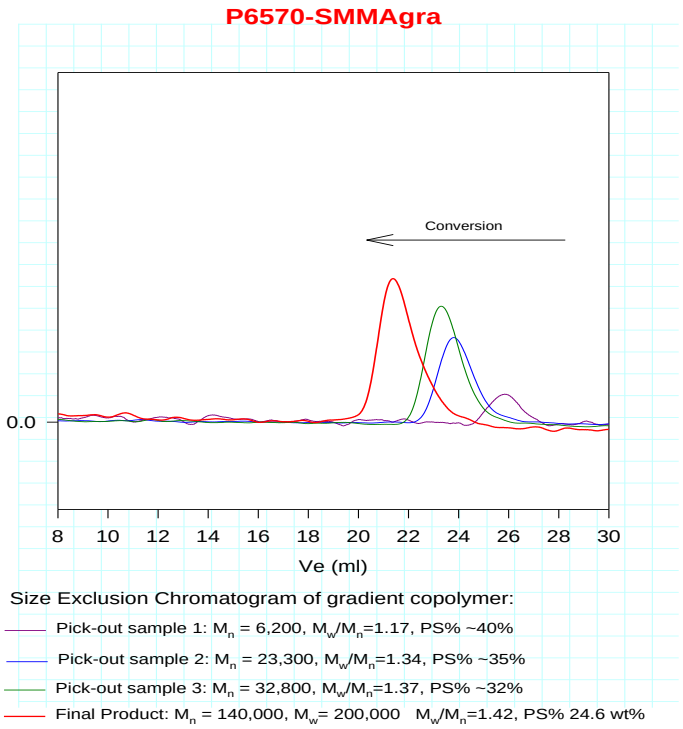
Solubility:

Random Copolymer Poly(styrene-co-MMA) is soluble in $CHCl_3$, THF, DMF at this composition and precipitated out from methanol.

Proton NMR of copolymer:



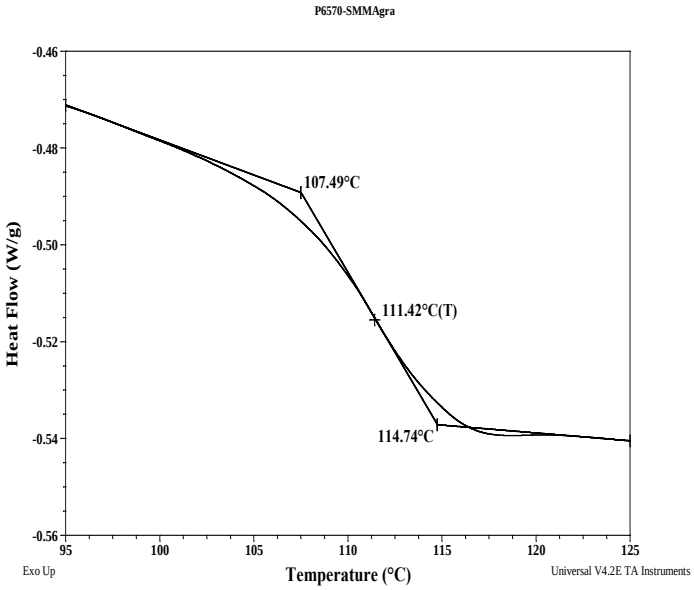
SEC of the random copolymer:



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).

The glass transition temperature for the polymer was found to be **111°C**.



FT-IR of the random copolymer: