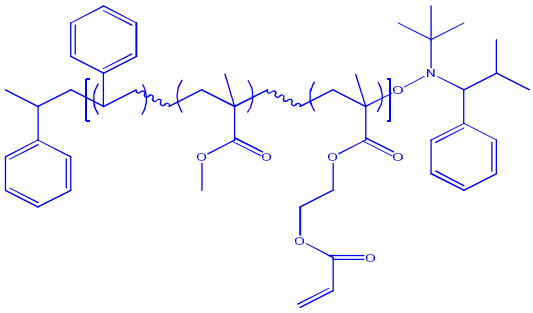
Sample Name:

Random Copolymer Poly(styrene-co-methyl methacrylate-co-acryloylethyl methacrylate)

Sample #: **P6589-SMMAAEtMAran**

Structure:



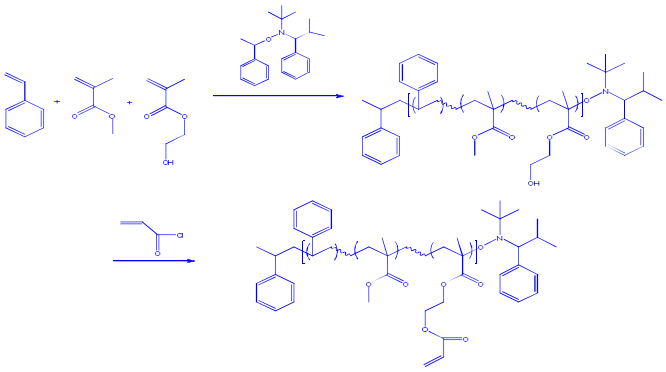
Composition:

PS (mol%) : 57%; MMA: 41%; AEtMA: 2%

Mn x 10^3 S-co-MMA-co-VB	PDI
35.6	1.28
T_g for the random copolymer	104°C

Synthesis Procedure:

Random Copolymer is prepared by nitroxide-mediated radical polymerization of styrene, HEMA and MMA, following by an esterification with acryloyl chloride.



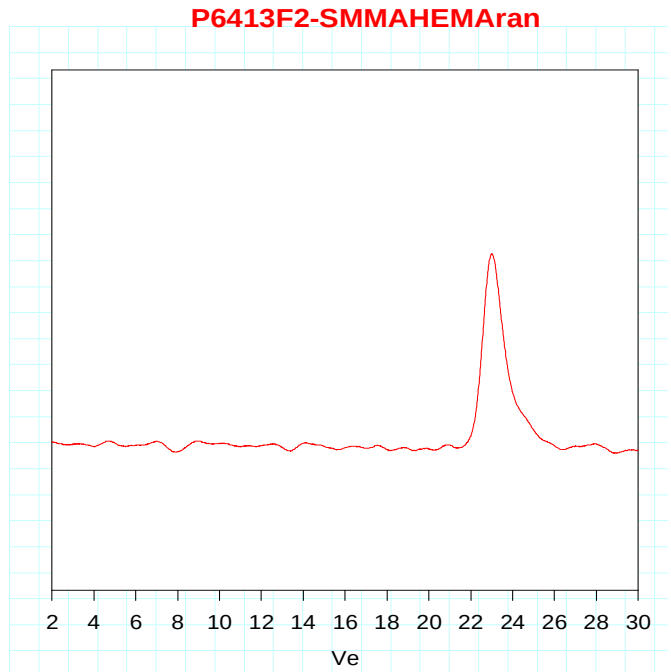
Characterization:

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 methyl methacrylate at about 0.8-3.8 ppm that deducts the contribution of the styrene back bone protons.

Solubility:

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

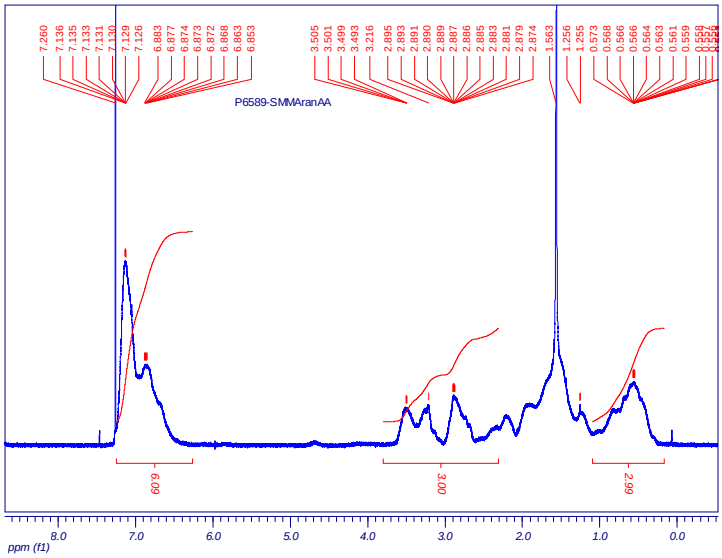
SEC of the random copolymer:



Size Exclusion Chromatography of Poly(Styrene-co-MMA-co-HEMA):

M_n= 35600, M_w= 45600, M_w/M_n =1.28

Proton NMR of copolymer:



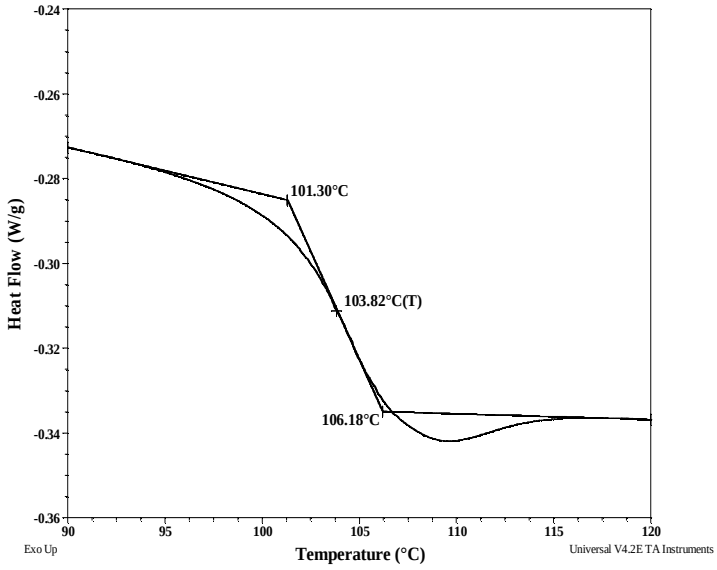
Thermal analysis of the sample P6589-SMMAranAA:

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). During thermal scan a peak was observed at 190°C which corresponds to cross-linking of the polymer. In addition, heat treated polymer was not dissolved in $CHCl_3$. During rescanning of the heat-cooled polymer the T_g has changed by 2°C as shown in the thermogarms below.

Glass transition temperature before and after rescanning:

T_g(°C) 1st run	104
T_g(°C) rerun	106

DSC thermogram in the fist run:



DSC thermogram of heat-cooled sample: