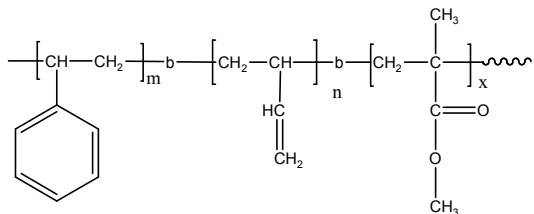## Sample Name:

Poly(styrene-b-butadiene(rich in 1,2 addition)-b-methylmethacrylate)

Sample #: P5421-SBdMMA
(PBd 1,2 addition>90%)

Structure:

Composition:

Mn x 10^3 S-b-Bd-b-MMA	PDI
32-b-3.5-b-247.0	1.25
T_g for Bd and PS block: Not distinct	T_g for MMA block: 130°C

Synthesis Procedure:

The polymer is synthesized by living anionic polymerization in THF with sequence addition of styrene, butadiene (Bd), then methyl methacrylate (MMA).

Characterization:

First Block: Size exclusion chromatography (SEC): Varian liquid chromatograph equipped with UV and refractive detector. SEC columns from Supelco were used with THF as the eluent. The columns were calibrated with monodisperse polystyrene. The molecular weights and the polydispersity index were calculated.
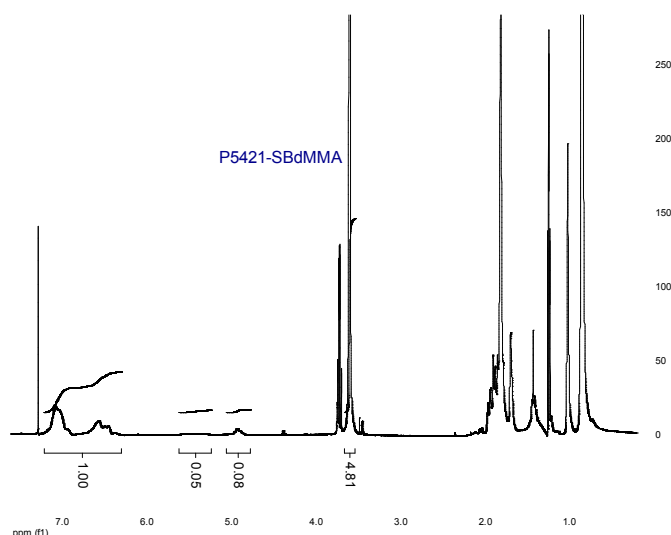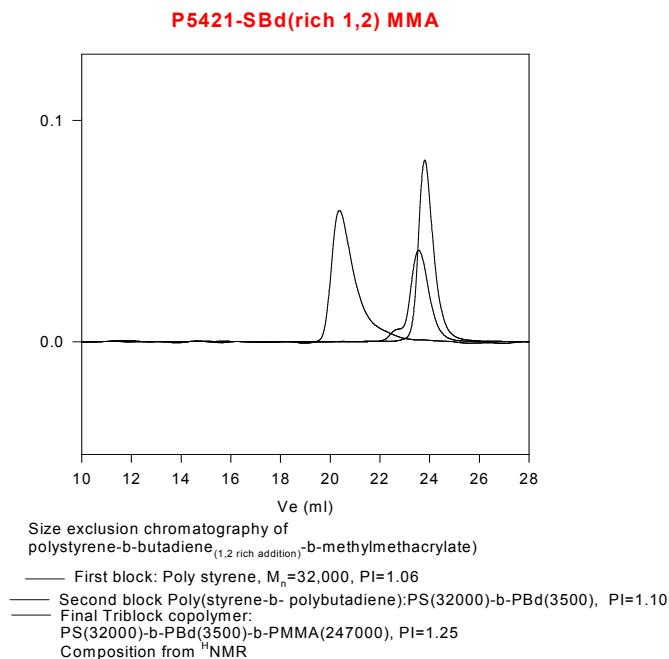
Second and Third Block: The chemical composition was extracted from proton NMR, which was recorded from Varian 500MHz instrument using $CDCl_3$ as solvent. The molecular weights of second and third block were calculated based on the molecular weight of other blocks and the chemical composition. The polydispersity index of block copolymer was obtained by SEC as described above.

Thermal analysis of the sample:
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:
Polymer is soluble in THF, toluene, and $CHCl_3$. The polymer readily precipitates from hexanes, ether and water.

^{1}H-NMR Spectrum of the product

SEC for the polymer:

Size exclusion chromatography of polystyrene-b-butadiene(1,2 rich addition)-b-methylmethacrylate)

—— First block: Poly styrene, M_n=32,000, PI=1.06
—— Second block Poly(styrene-b- polybutadiene):PS(32000)-b-PBd(3500), PI=1.10
—— Final Triblock copolymer: PS(32000)-b-PBd(3500)-b-PMMA(247000), PI=1.25
Composition from ^{H}NMR

DSC thermogram for the MMA block: