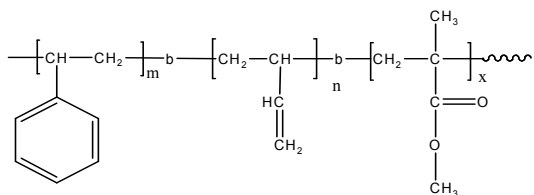**Poly(styrene-b-butadiene (rich in 1,2 addition)-b-methylmethacrylate)**

Sample #: **P5414-SBdMMA**

Structure:

Composition:

Mn x 10³ S-b-Bd-b-MMA		PDI
49.0-b-14.0-b-211.0		1.20
T_g for Bd block: -33°C	T_g for PS block: 99°C	T_g for MMA block:134°C

Synthesis Procedure:

The triblock polymer is synthesized by living anionic polymerization in THF with sequence addition of styrene, butadiene (Bd), and 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 CDCl₃ 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:

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 was considered as the glass transition temperature (T_g).
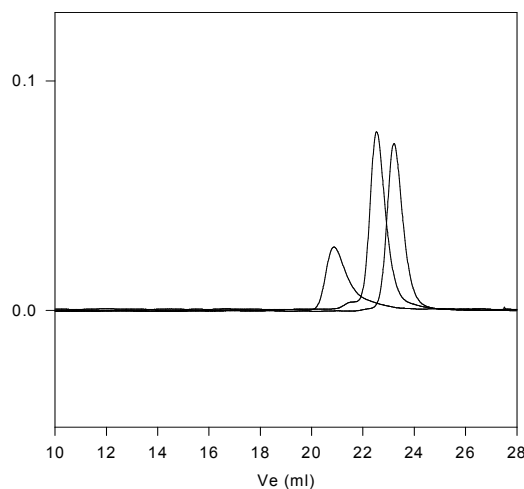
Solubility:

Polymer is soluble in THF, toluene, and CHCl₃. The polymer readily precipitates from hexanes, ether and water.
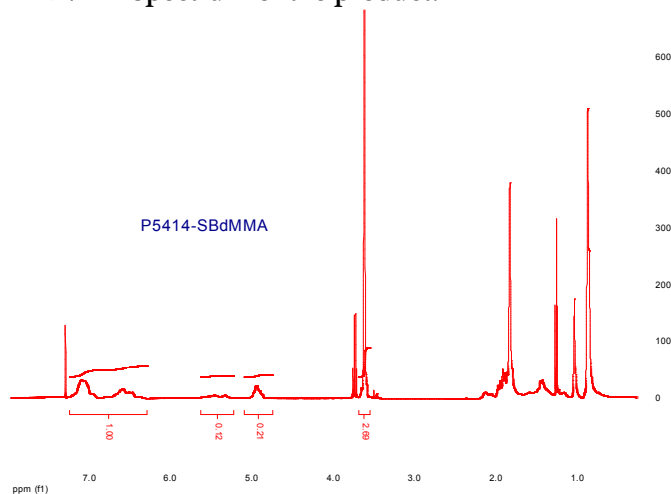
DSC thermogram Bd block:
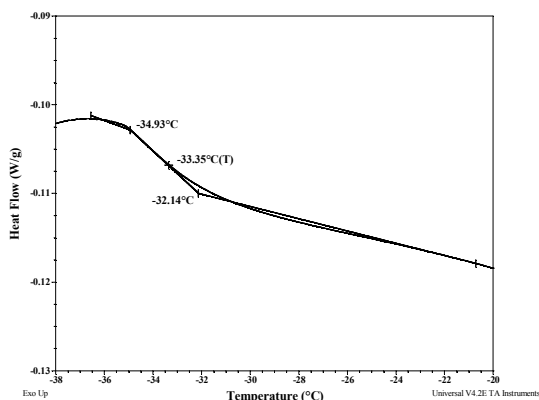
SEC for the polymer:

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

—— First block: Poly styrene, Mₙ=49,000, PI=1.06
—— Second block Poly(styrene-b- polybutadiene):PS(49000)-b-PBd(14000), PI=1.06
—— Final Triblock copolymer:
PS(49000)-b-PBd(14000)-b-PMMA(211000), PI=120
Composition from ᴴNMR

¹H-NMR Spectrum of the product:

DSC thermogram PS & MMA block: