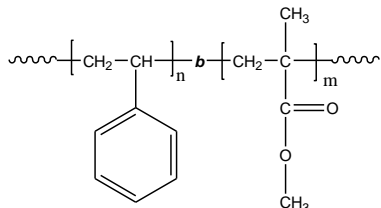


Sample Name: Hydroxy terminated Poly(styrene-b-methyl methacrylate)

(polymethylmethacrylate rich in syndiotactic contents > 78%)

Sample #: P4139-HOSMMA

Structure:

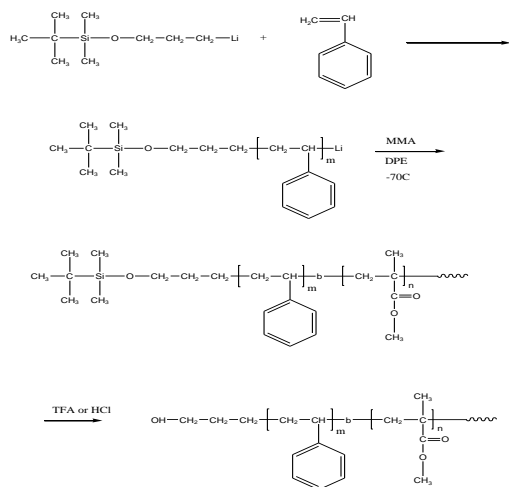


Composition:

Mn x 10 ³ S-b-MMA	PDI
30.0-b-21.0	1.14

Synthesis Procedure:

HO terminated Poly(styrene-b-methyl methacrylate) is prepared by living anionic polymerization in THF at -78 °C using tert.butyl dimethyl siloxy propyl lithium as initiator in the presence of LiCl. Polystyrene macroanions were end capped with a unit of diphenyl ethylene (DPE) before adding methylmethacrylate (MMA) monomer.



Characterization:

An aliquot of the anionic polystyrene block was terminated before addition of MMA and analyzed by size exclusion chromatography (SEC) to obtain the molecular weight and polydispersity index (PDI). The final block copolymer composition was calculated from ¹H-NMR spectroscopy by comparing the peak area of the poly(methyl methacrylate) protons (eg. -OCH₃ at 3.6ppm) with the of aromatic protons of polystyrene at 6.3-7.2 ppm. Copolymer PDI is determined by SEC.

Thermal Analysis:

Thermal analysis of the samples was carried out using a differential scanning calorimeter (TA Q100) at a heating rate of 15°C/min. The inflection glass transition temperature (T_g) of the sample has been considered.

Solubility:

Poly(styrene-b-methyl methacrylate) is soluble in THF, toluene, dioxane and CHCl₃. This polymer readily precipitates from methanol, ethanol, hexanes and water.

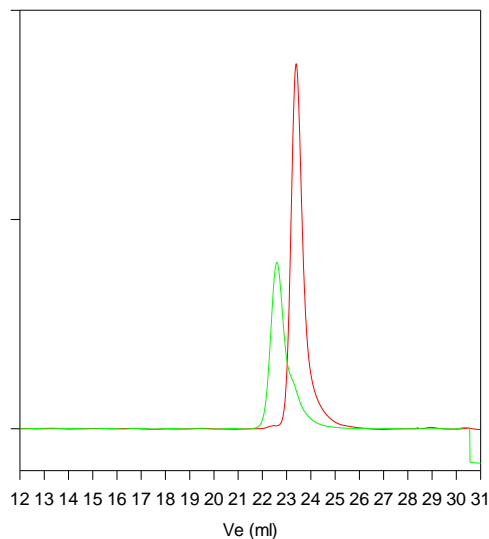
Purification:

Purification of the obtained polymer was carried out rigorously as follows to ensure the removal of the catalyst side product:

1. Polymer first soxhlet in Cyclohexane to remove trace amount of homopolystyrene fraction if any present.
2. Dissolved the polymer in CHCl₃ and wash with de-ionized distilled water to remove any soluble organic catalyst side product.
3. Polymer extracted from water with chloroform.
4. Polymer solution in CHCl₃ was dried over anhydrous sodium sulfate.
5. Solution filtered and then passed through a column packed with basic Al₂O₃.
6. Solution concentrated on rota-evaporator
7. Solution precipitated in cold methanol and redissolved in dioxane and freeze dried.
8. Final dried under vacuum for 48h at 50°C.

SEC of Sample

P4139-HOSMMA



— Polystyrene, M_n=30000, M_w=32000, PI=1.09
— Block Copolymer PS(30000)-b-PMMA(21000), PI=1.14