

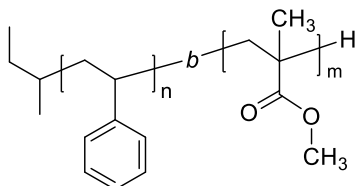
Sample Name:

**Poly(styrene)-*b*-poly(methyl methacrylate),
diblock copolymer**

Sample ID #: **P42575-SMMA**

CAS registry number: 25034-86-0

Structure:



Composition:

$M_n \times 10^3$ (g/mol) [PS- <i>b</i> -PMMA]	M_w/M_n
26- <i>b</i> -54	1.01

Synthesis Procedure:

Poly(styrene-*b*-methyl methacrylate) was synthesized by living anionic polymerization in THF at -78°C using sec-BuLi initiator in the presence of LiCl. Polystyrene macroanions were end-capped with a unit of diphenyl ethylene (DPE) before adding methylmethacrylate (MMA) monomer. For more details, see ref. [1–4].

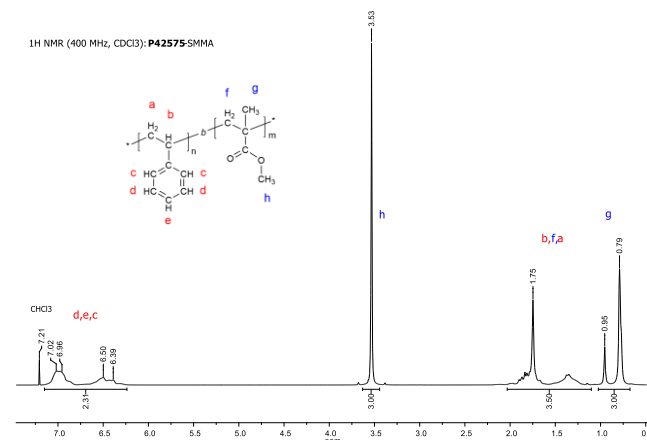
Characterization:

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 of the first block. The final diblock copolymer composition was calculated by proton NMR spectroscopy by comparing the peak area of the poly(methyl methacrylate) protons -OCH₃ (3.6ppm) with aromatic protons of polystyrene (6.3–7.2 ppm), and using SEC data for the first block. Polydispersity index of the final product was determined by SEC.

References:

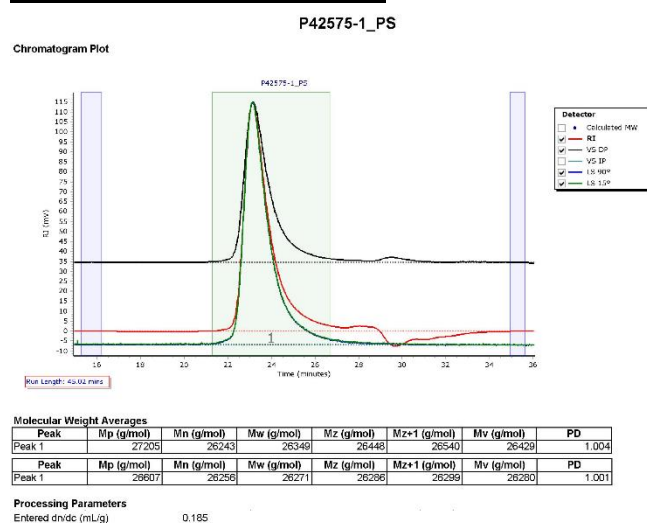
1. S. K. Varshney, R. Fayt, Ph. Teyssie, J.P. Hautekeer; US Patent 1993, 5, 264, 527.
2. Ph. Teyssie, Ph. Bayard, R. Jerome, S. K. Varshney, J. S. Wang; 35th IUPAC International Union of Pure and Applied Chemistry, International Symposium on Macromolecules, 1994, 67.
3. Ph. Teyssie, R. Fayt, J. P. Hautekeer, C. Jacobs, R. Jerome, L. Leemans, S. K. Varshney; Makromolekular Chemie, Macromol. Symp., 1990, 32, 61–73.
3. S. K. Varshney, J. P. Hautekeer, R. Fayt, R. Jerome, Ph. Teyssie; Macromolecules, 1990, 23, 2618–2622.

¹H NMR spectrum of the product in chloroform-d:



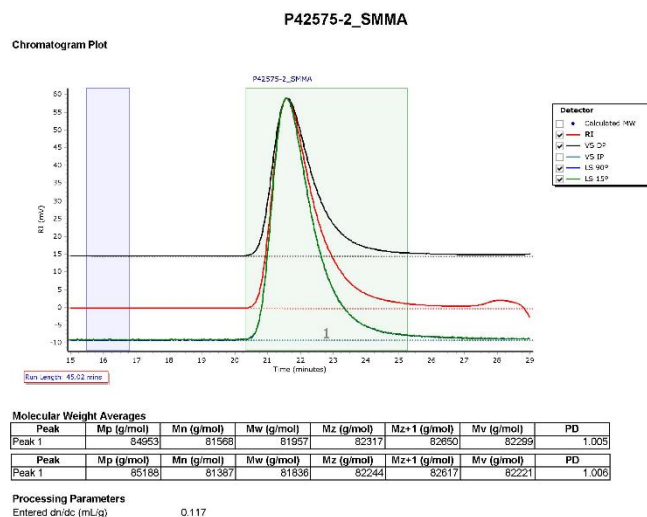
PS : PMMA ratio = 32 : 68 mol%; 33 : 68 wt%

SEC of PS first block in THF:



Degree of polymerization: $D_p = 252_{[PS]} - 535_{[PMMA]}$

SEC of PS-PMMA diblock copolymer in THF:



dn/dc(PS in THF)=0.185; dn/dc(PMMA in THF)=0.084; dn/dc (average for S:MMA=0.33:0.68)=0.117

(v. I-1.1)