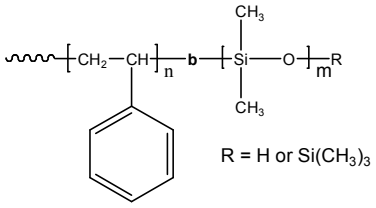
Sample Name:
Poly(styrene-b-dimethyl siloxane)
Sample #: P8709-SDMS (R=H)

Structure:



Composition:

Mn x 10^3 S-b-DMS	Mw/Mn (PDI)
22.0-b-21.0	1.08

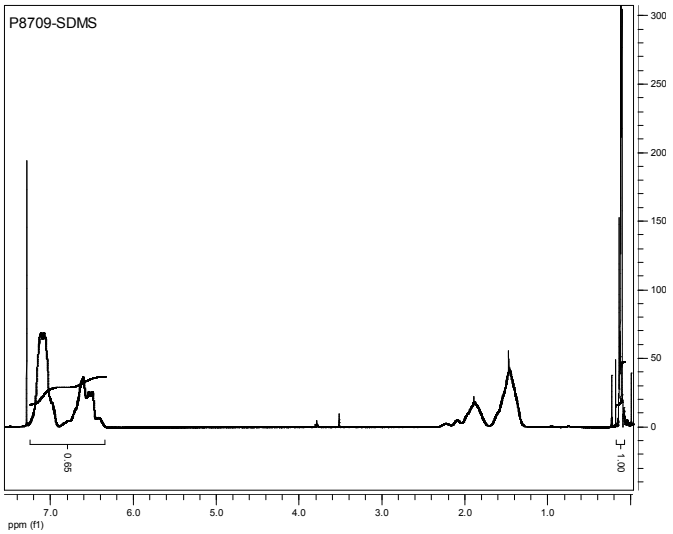
Synthesis Procedure:

Poly(styrene-b-dimethyl siloxane) is prepared by living anionic polymerization with sequence addition of styrene followed by hexamethyl cyclotrisiloxane. For the details please see the references.

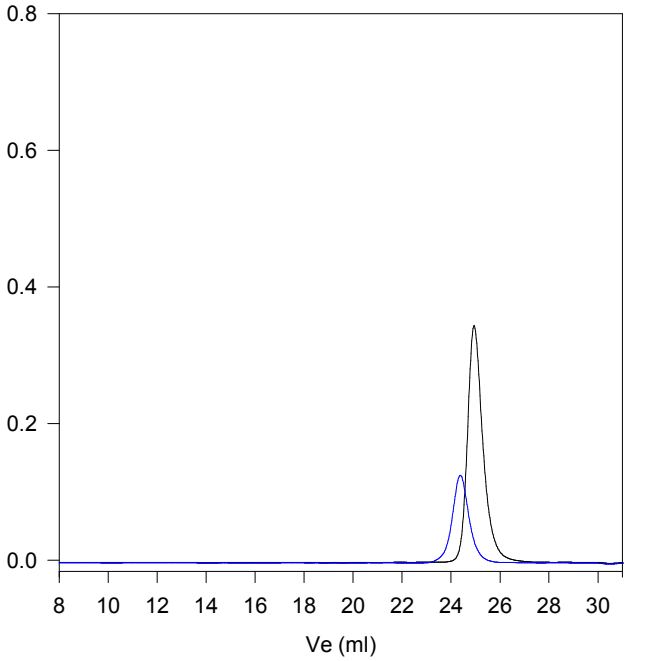
Characterization:
An aliquot of the polystyrene block was terminated before addition of hexamethyl cyclotrisiloxane and analyzed by size exclusion chromatography (SEC) to obtain the molecular weight and polydispersity index (PDI). The final block copolymer composition was calculated from ^{1}H-NMR spectroscopy by comparing the peak area of the styrene protons at 6.3-7.2 ppm with the peak area of siloxane protons near 0.13 ppm. Block copolymer PDI is determined by SEC.

Solubility:
Poly(styrene-b-dimethyl siloxane) is soluble in CHCl3, toluene, THF.

^{1}H NMR spectrum of the sample:



SEC profile of the block copolymer



Size exclusion chromatography of poly(styrene-b-dimethylsiloxane)

Polystyrene, M_n=22,000, M_w=23,000, M_w/M_n=1.05

Poly(styrene-b-dimethylsiloxane)

M_n: PS(22,000)-b-PDMS(21,000) M_w/M_n=1.08

References:

A) S. K. Varshney, D. N. Khanna "Hexamethylcyclotrisiloxane-Styrene Block Copolymers and their Chemical Composition" *CA Vol. 093, 26, 240325,. J. Appl. Polym. Sci., 1980, 25, 2501-2511. B)* P. Bajaj, S. K. Varshney, "Morphology and Properties of Poly(Dimethylsiloxane-b-Styrene-b-Dimethylsiloxane) Polymers" *CA Vol. 093, 02, 008652, Polymer, 1980, 21, 201-206. (C)* S. K. Varshney, C. L. Beatty "Synthesis and Characterization of Polymethylmethacrylate and Polydimethylsiloxane Block Copolymers Polymerizes with an Organometallic Initiator" *Org. Coat. Appl. Polym. Sci., 1981, 45, 151-157. d).* S. K. Varshney, C. L. Beatty, and P. Bajaj "Morphology and Properties of Styrene and Dimethylsiloxane Triblock and Multiblock Copolymers" *CA Vol. 098, 139, 017855, Am. Chem. Soc. Polym. Prepr., 1981, 22, 321-323.*

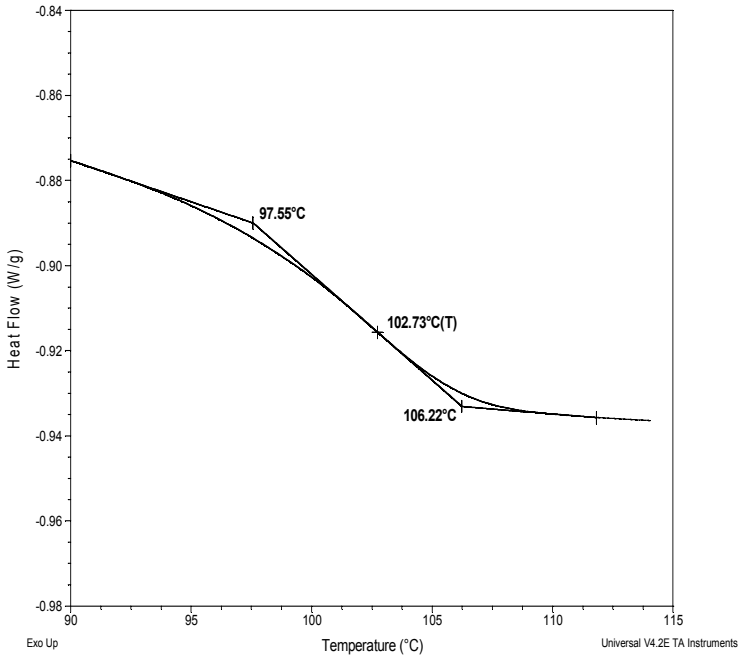
Thermal analysis of the sample# P8709-SDMS

Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of 20^{o}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). For DMS block, we have adapted literature T_g value since it lies lower than our DSC temperature range.

Thermal analysis results at a glance

For DMS block		
T_g: -127^{o}C (Literature value)	T_m: -42^{o}C	T_c: -66^{o}C
For PS block		
T_g: 103^{o}C	T_m: -	T_c: -

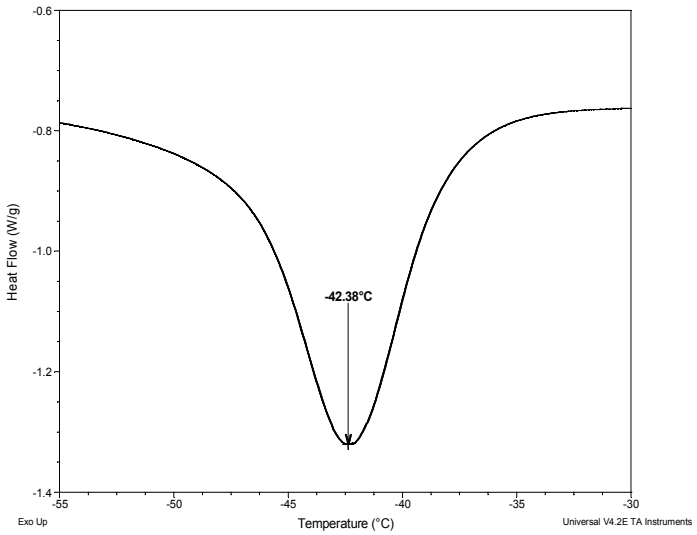
Thermogram for PS block:



Melting and crystallization curve for the sample

The melting temperature (T_m) was taken as the maximum of the endothermic peak where as the crystallization temperature (T_c) was considered as the minimum of the exothermic peak.

Melting curve for DMS block



Crystallization curve for DMS block