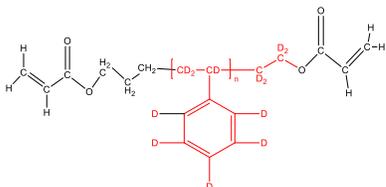


Sample Name:

Deuterated Poly(styrene-d8), α,ω -bis(acrylate)-terminated

Sample #: **P43595A-dPS2acrylate**

Structure:

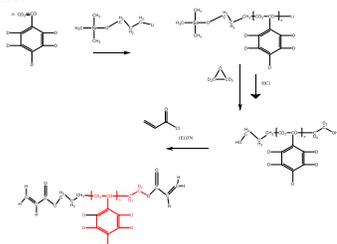


Composition:

Mw x 10 ³	PDI
0.8	1.13
End group Functionality: > 95%	

Synthesis Procedure:

α, ω -Hydroxy Terminated deuterated Polystyrene-d8 was prepared by living anionic polymerization of styrene-d8, followed by modification of terminal OH to acrylate unit.



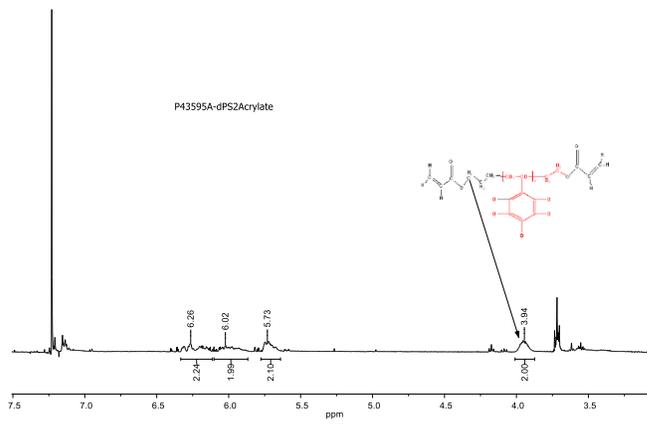
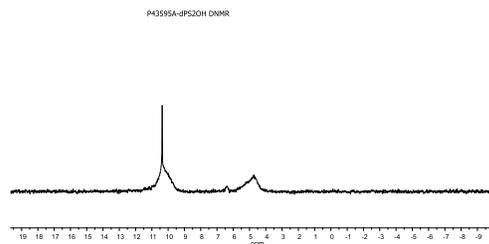
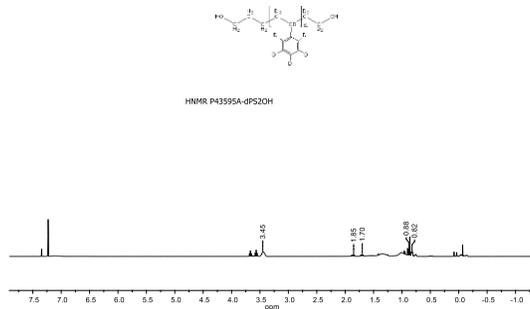
Characterization:

The product was characterized by size exclusion chromatography (SEC), ¹H NMR, Deuterium NMR and FTIR data analysis.

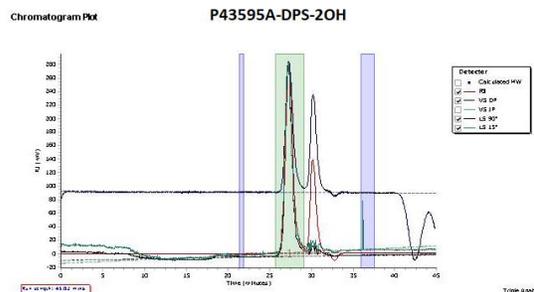
Solubility:

Polymer is soluble in toluene, THF, CHCl₃ and can be precipitated in water and, cold methanol.

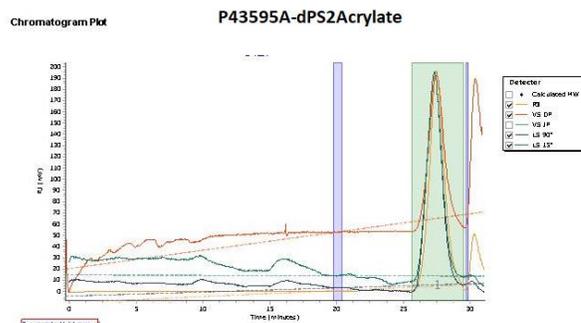
¹H-NMR spectrum of the Polymer:



SEC elugram of the sample:



Peak	Mp (g/mol)	Mn (g/mol)	Mw (g/mol)	Mz (g/mol)	Mz+1 (g/mol)	Mv (g/mol)	PD
Peak 1	867	774	844	906	966	0	1.09



Peak	Mp (g/mol)	Mn (g/mol)	Mw (g/mol)	Mz (g/mol)	Mz+1 (g/mol)	Mv (g/mol)	PD
Peak 1	956	850	965	1078	1195	1042	1.133

Qualitative functionality determination by FTIR:

It is difficult to determinate accurately functionality by HNMR and DNMR therefore, attempt was made to check the functionality by FTIR using integration of C=O from terminal acrylate using blends of dPS polymer with acrylic acid/methyl acrylate. Position of C=O in the blends of acrylic acid and homo deuterated polystyrene is different than the C=O presence in functionalized polymer (it is the form ester terminal group)

FTIR Spectroscopy. The FTIR spectroscopy was carried out on Perkin-Elmer Spectrum Two apparatus. For qualitative analysis, polymer films were cast on a KBr window. The spectra of the films were recorded. For quantitative measurements, the spectra of polymer solutions in CHCl₃ were recorded with a KBr cell (optical path = 15 μ). As the carbonyl C=O of poly(methyl acrylate) gives a very strong and narrow absorption band in the infrared region at 1725 cm⁻¹, FTIR spectroscopy can be used to subsequently determine the end functional acrylate content of the polymer. The procedure consisted in calibrating a KBr cell homopoly (methyl acrylate) solution in CHCl₃ and determining the absorbance of a solution of the dPS polymer PdPS acrylate of known concentration in the same cell. In order to obtain the extinction coefficient of the C=O, the absorbance at 1725 cm⁻¹ was plotted as a function of the concentration of homopoly(methyl acrylate) . A straight line was obtained as expected from the Beer-Lambert law. The extinction coefficient, which is 0.384 OD L/g was obtained from the slope. Thus, the weight fraction of end terminal unit of acrylate) in the polymers was calculated and found quantitative functionality.

