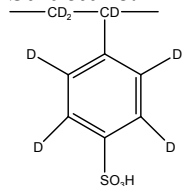


Sample Name: Deuterated Poly (styrene sulfonic acid) Sodium salt -Dialysed form

Sample #: P40412A-dPSSO3Na

Structure:

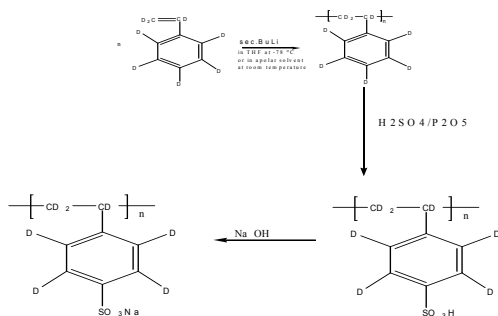


Composition:

Mn x 10 ³	PDI
36.5	1.08
C:H:S By elemental analysis	38.33:5.21:11.4
Degree of sulfonation	>99%

Synthesis Procedure:

Deuterated polystyrene-d₈ is obtained by living anionic polymerization of styrene-d₈. The obtained polymer was sulfonated in the presence of H₂SO₄/P₂O₅. The polymerization scheme and the sulfonation can be illustrated as below.



Characterization:

Size exclusion chromatography (SEC) was carried out on a Varian liquid chromatography equipped with a refractive detector. For the precursor polystyrene, two columns from Supelco (G4000-2000 HXL) were used with THF as the eluent. The columns were calibrated with monodisperse polystyrene standards. The molecular weight and the polydispersity indice were calculated. For polystyrene sulfonic acid, a column from Supelco (G5000 PWXL) was used with 0.1 NaNO₃ /water as the eluent.

The degree of sulfonation was determined by acid/base titration and by elemental analysis.

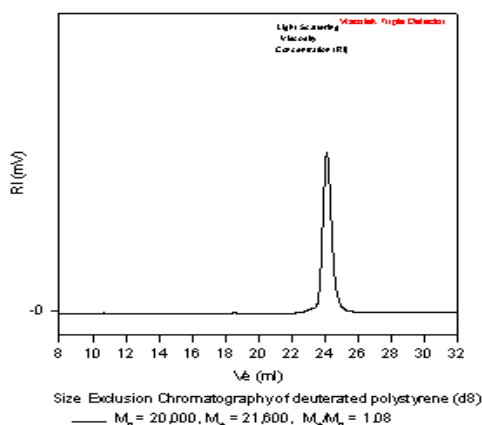
Solubility:

Deuterated polystyrene-(d₇) sulfonic acid is soluble in water, methanol and ethanol. It precipitates from hexane, toluene, THF.

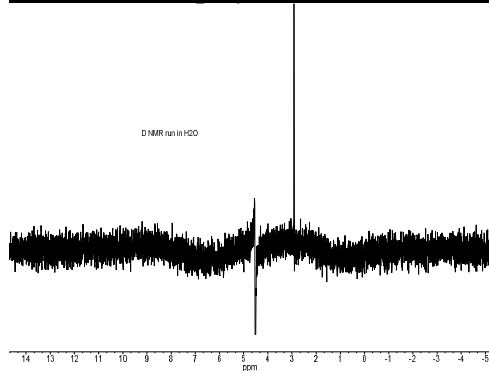
Dialysis of the Polymer:

Dialysis was carried out in a membrane (from spectrum Co). The solution was prepared in H₂O (distilled Millipore) and filtered after the dialysis is completed. Normally it was carried out for 3 days. The obtained polymer was freeze dried in water.

SEC of Homopolymer: (starting polystyrene) dPS



D-NMR of the polymer recorded in water



D-NMR of the polymer recorded in methanol

