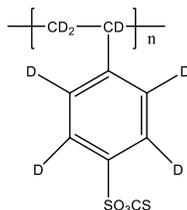


Sample Name:

Deuterated Poly(styrene sulfonic acid-d7, cesium salt)

Sample #: P2323-dPSSO3Cs

Structure:



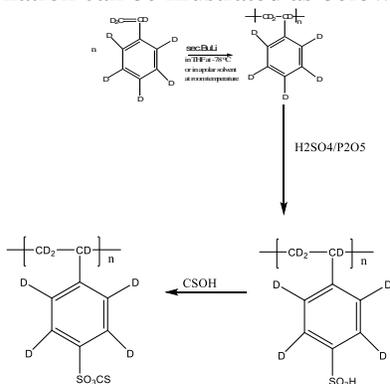
Composition:

Mn x 10 ³	PDI
10.0	1.05

C:H:S (By elemental analysis) 39.68:5.43:11.01

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 chromatograph 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 index 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:

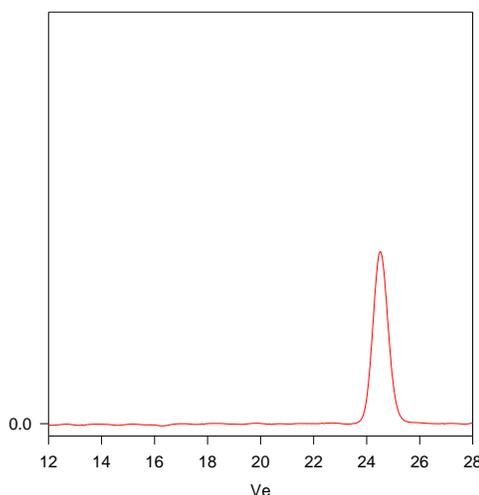
Deuterated polystyrene-(d7) sulfonic acid is soluble in water, methanol, and ethanol. It precipitates from hexane, toluene, and THF.

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 profile of Homopolymer: (starting polystyrene)

P2323-dPS Precursor for P2323-dPSSO3Cs



Size Exclusion Chromatography of deuterated (d8) Polystyrene:

M_n = 3490, M_w = 3660, PI=1.05 After Converting to PdPSSO3H: Mn 6,000
Mn of dPSS3CS salt : Mn 10,000