

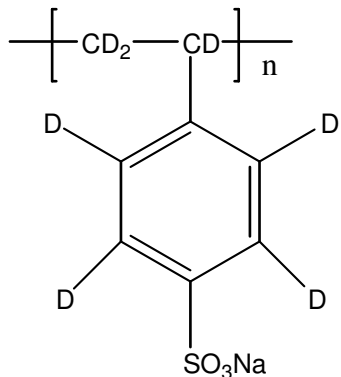
Sample Name:

Deuterated Poly (styrene sulfonic acid sodium salt)

Dialysed form

Sample #: **P2324-dPSSO3Na**

Structure:



Composition:

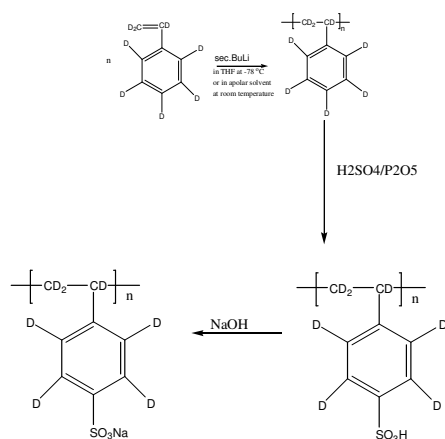
Mn x 10 ³	PDI
36.5	1.05

C:H:S By elemental analysis	42.68:5.43:14.01
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Degree of sulfonation	>99%
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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 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:

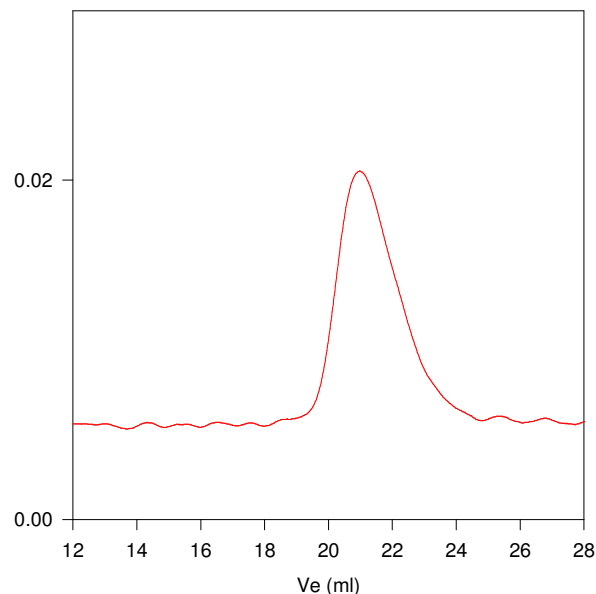
Deuterated polystyrene-(d₇)sulfonic acid is soluble in water, methanol and ethanol. It precipitates from hexane, toluene, THF.

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)

P2324-dPS for P2324-dPSSO3H/Na



Size exclusion chromatography of deuterated polystyrene(d₈):

M_n=19000 M_w=19900, PI=1.04