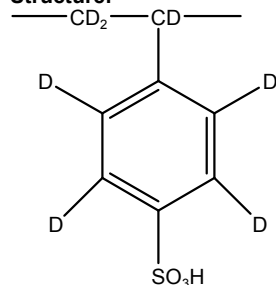


Sample Name:
Deuterated Poly (styrene sulfonic acid)
Dialysed form
Sample #: P4123-dPSSO3H

Structure:

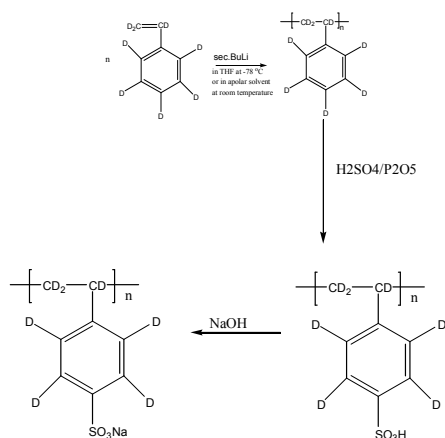


Composition:

Mn x 10 ³	PDI
63.0	1.07
C:H:S By elemental analysis	39.68; 5.43;11.01
Degree of sulfonation	>80%

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 indices 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:

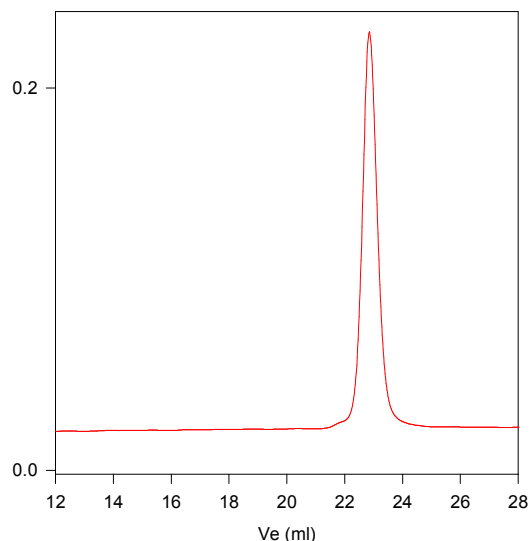
Deuterated polystyrene-(d₇)sulfonic acid is soluble in water, methanol and ethanol. It precipitates from hexane, toluene, THF.

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)

The Precursor dPS used for Sulfonation P8859-dPS



Size Exclusion Chromatograph of Deuterated Polystyrene-d₈

M_n=55000, M_w=57700, M_w/M_n=1.05

After Sulfonation: Mn Pd7SSO3H: Mn: 94,000 Mw/Mn 1.09

After Neutralization with NaOH;
 Pd7SSO3Na: 105,000 Mw/Mn: 1.05