

Sample Name:

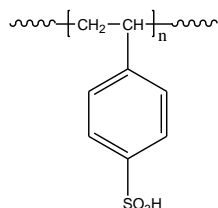
**Poly (4-styrene sulfonic acid)**

**Or Poly (styrene sulfonic acid)**

In dialysed form or undialysed form

**Sample #: P5159-SSO3H Dialysed form**

**Structure:**

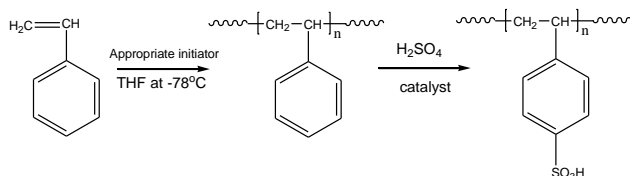


**Composition:**

$M_n \times 10^3$	PDI
71.0	1.05
Degree of sulfonation	>96%

**Synthesis Procedure:**

Poly (styrene sulfonic acid) is obtained from the sulfonation of polystyrene. Polystyrene was obtained by anionic living polymerization. The molecular distribution of the obtained polystyrene sulfonic acid remains same as of the parent polymer. Furthermore the HNMR and FTIR spectroscopy of the polymer shows the sulfonation is predominately at par position of phenyl group. The reaction scheme is illustrated 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  $NaNO_3$  /water as the eluent. The degree of sulfonation was determined by acid/base titration and by elemental analysis.

**Solubility:**

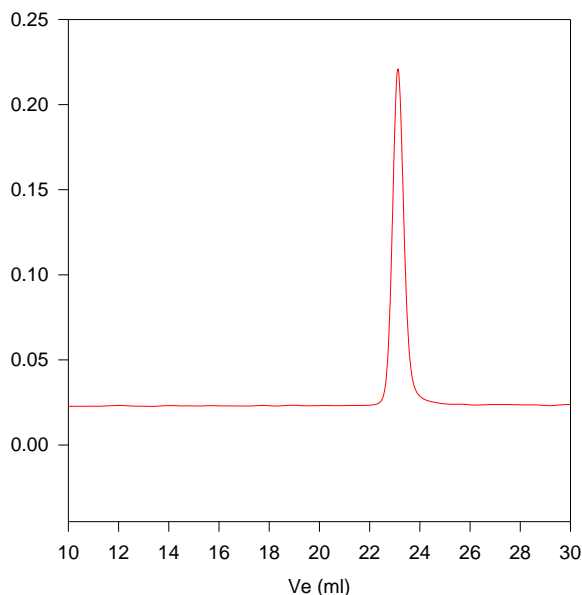
Poly (styrene sulfonic acid) is soluble in methanol, water and precipitated out from the hexane, THF, toluene.

**Dialysis of the Polymer:**

Dialysis was carried out in a membrane (from spectrum Co). The solution was prepared in  $H_2O$  (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:**

**Precursor for P5159-SSO3H (P5158-S)**



Size exclusion chromatograph of polystyrene:

$M_n=40000$   $M_w=42000$   $PI=1.05$

After Sulfonation  $M_n$ : 71000  $M_w/M_n$ : 1.05

Degree of sulfonation by elemental analysis > 96%