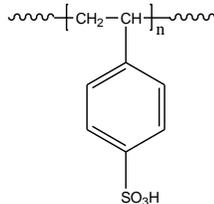


Sample Name: Ionomer of Poly (styrene-co-4-Styrene sulfonic acid)

Sample #: P40902B-SSO3H
dialysed form

Structure:

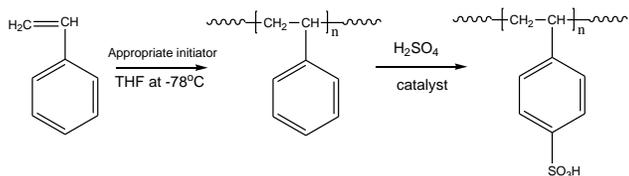


Composition:

| | |
|-----------------------|------|
| Mn x 10 ³ | PDI |
| 9.7 | 1.09 |
| Degree of sulfonation | >80% |

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:



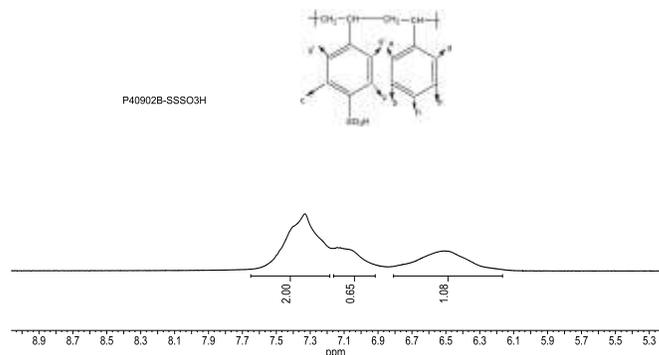
Characterization:

The molecular weight and polydispersity index (PDI) of poly (styrene sulfonic acid) are obtained by size exclusion chromatography. The degree of sulfonation is 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.

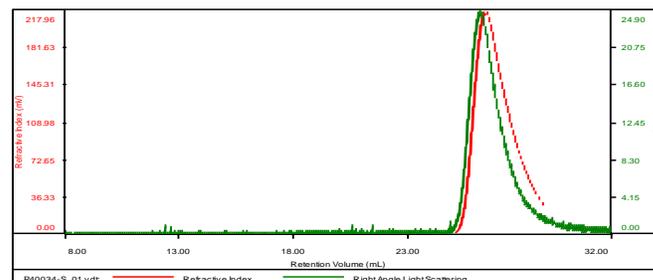
¹HNMR spectrum of the Sample runs in DMSO:



SEC elugram of Polystyrne used for sulfonation process:

Sample ID: P40034-S

| | |
|-----------------------|---------------------------|
| Concentration (mg/mL) | 7.2266 |
| Sample dr/dc (mL/g) | 0.1850 |
| Method File | PS80K-30JUNE2016-0000.vcm |
| Column Set | 3x PL 1113-6300 |
| Solvent | THF |



| Sample | Mn (Da) | Mw (Da) | Mw/Mn | IV (dL/g) | Mp (Da) |
|-----------------|---------|---------|-------|-----------|---------|
| P40034-S_01.vdt | 5,962 | 6,540 | 1.097 | 0.1017 | 7,095 |