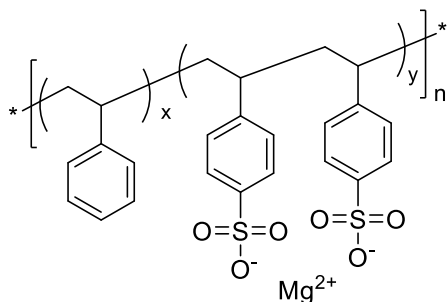


Sample Name:

**Poly (styrene-*co*-4-styrene sulfonic acid magnesium salt) ionomer**

Sample #: **P41842A-SSO3Na**

Structure:



Composition:

Mn x 10 <sup>3</sup> (g/mol)	M <sub>w</sub> /M <sub>n</sub>	Degree of sulfonation
11.1	1.03	13 mol%

Synthesis procedure:

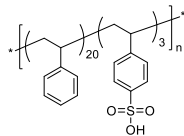
Poly (styrene-*co*-4-styrene sulfonic acid) was synthesized by partially sulfonation of monodispersed polystyrene, followed by its converting to magnesium salt.

Characterization:

The molecular weight and polydispersity of the polymer was determined by size exclusion chromatography (SEC). Degree of sulfonation was calculated by elemental analysis and compared to proton NMR data.

**Elemental analysis of poly (styrene-*co*-4-styrene sulfonic acid) precursor:**

Sample: P41842					
Analysis	Method	Result	Basis	Sample Amount Used	Date (Time)
C : Carbon	GLI Procedure ME-14	78.37 %	As Received	1.255 mg	2019-06-17
H : Hydrogen	GLI Procedure ME-14	7.22 %	As Received	1.255 mg	2019-06-17
O : Oxygen	GLI Procedure E8-4	9.18 %	As Received	2.235 mg	2019-06-18
S : Sulfur	GLI Procedure E16-3	3.625 %	As Received	20.345 mg	2019-06-10

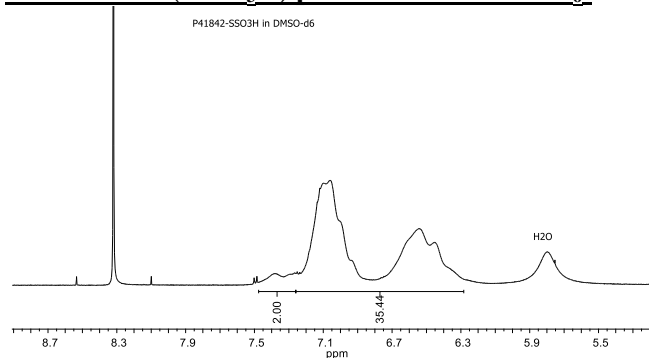


x(PS)=20; y(PS-SO3H)=3

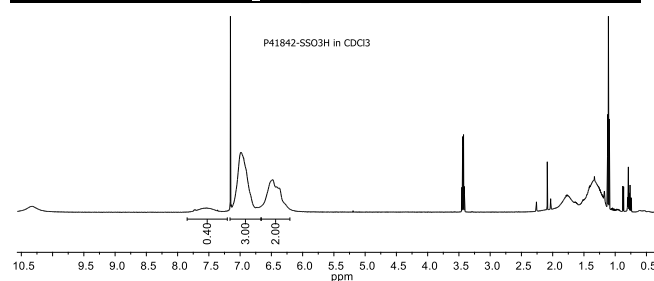
Chemical Formula: C<sub>184</sub>H<sub>184</sub>O<sub>9</sub>S<sub>3</sub><sup>2+</sup>

Elemental Analysis: C, 83.85; H, 7.04; O, 5.46; S, 3.65

**<sup>1</sup>H NMR of P(S-SO<sub>3</sub>H) precursor in DMSO-d<sub>6</sub>:**

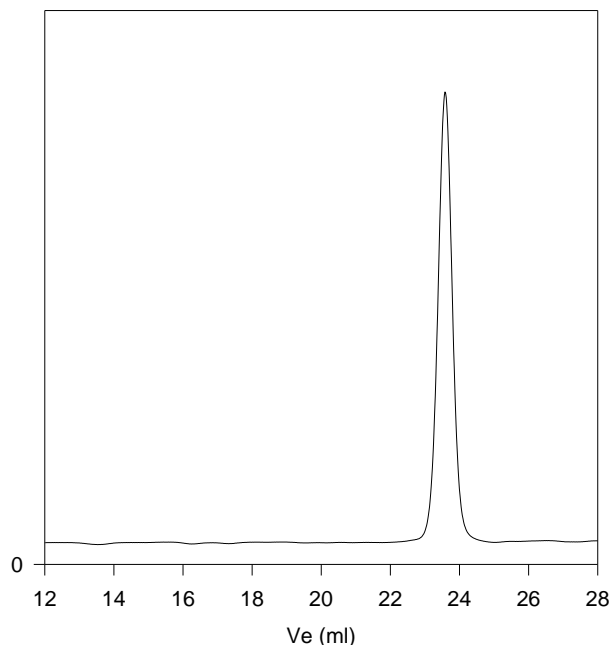


**<sup>1</sup>H NMR of P(S-SO<sub>3</sub>H) precursor in chloroform-d:**



**SEC chromatogram:**

**PS precursor to P41842B-SSO<sub>3</sub>H/Mg)**



Size exclusion chromatograph of polystyrene:

M<sub>n</sub>=10,000 M<sub>w</sub>=10,300, PI=1.03

Sulfonation Degree: 13 mol%; M<sub>n</sub>=11,000; M<sub>w</sub>=11,300; PDI=1.03

SSO3Mg: Mn=11,100; Mw: 11,500; PDI=1.03