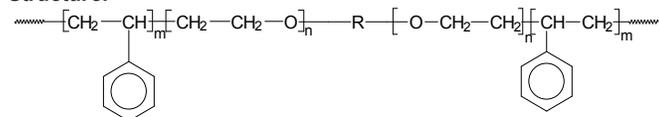


Sample Name:

Poly(styrene-b-ethylene oxide-b-styrene))

Sample #: **P8872-SEOS**

Structure:

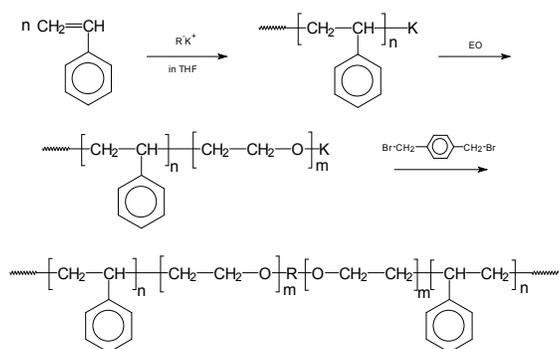


Composition:

Mn x 10 ³ S-b-EO-b-S	PDI
10.0-b-30.0-b-10.0	1.08

Synthesis Procedure:

The detail synthesis of such polymer has been reported.¹ The triblock copolymer was prepared by a coupling reaction of poly(styrene-b-ethylene oxide) anion with α - ω -dibromoxylene. The scheme of the reaction is illustrated below:



Characterization:

Polymer analyzed by size exclusion chromatography (SEC) to obtain the molecular weight and polydispersity index (PDI). The composition of the block copolymers was calculated by taking the ratio of the peak area of aromatic protons at 6.4 - 7.2 ppm to that of ethylene protons from PEO at 3.65 ppm. The molecular weight of PEO was then calculated from this composition and the molecular weight of PS obtained by SEC.

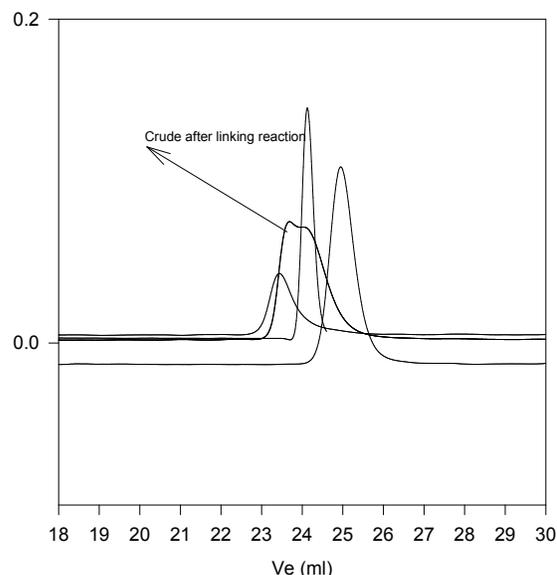
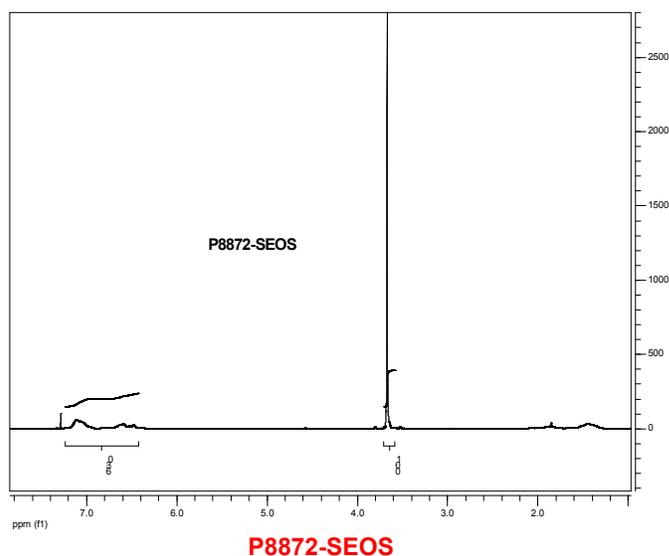
Solubility:

Poly(styrene-b-ethylene oxide-b-Styrene) is soluble in THF, toluene, and CHCl₃. The triblock copolymer can also be solubilized in methanol, ethanol depending on its composition. The polymer readily precipitates from hexanes, ether and water.

Purification of the polymer to remove unlinked fraction:

Product was purified to remove the unlinked fraction of the diblock copolymer by passing the solution of polymer (by taking different solvent mixture) through Silica column to remove unlinked fraction of Poly(St-b-EO) by taking advantage of the end group (OH) present in the diblock copolymer. This is the only way one can remove the unlinked fraction from the triblock copolymer. We have tried the solvent non solvent technique (fractional precipitation) procedure but fail to remove the unlinked diblock copolymer from the required ABA triblock copolymer.

¹H-NMR Spectrum of the product



Size Exclusion Chromatography:

— Polystyrene, M_n=10,000, M_w=10500, PI=1.05

— After adding ethylene oxide
(diblock PS-b-PEO) Mn PS(10000)-b-EO(15000) Mw/Mn 1.08

— After linking reaction (purified polymer)
PS(10000)-b-PEO(30000)-b-PS(10000), PI=1.08

References:

1. S.K. Varshney, Xing Fu. Zhong, P. Kesani, N.Varshney
"Architecturally control polymers from Academia to the Industry"
ACS-Symposium, Orlando, August, 1996.