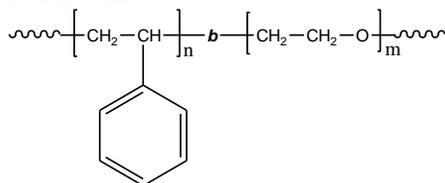Sample Name: **Poly(styrene-b-ethylene oxide)**

Sample #: **P8658-SEO**

Structure:
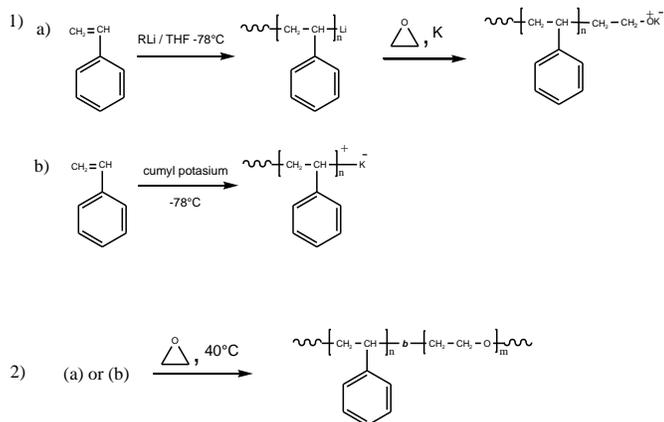

Composition:

Mn x 10³ S-b-EO	PDI
40.0-53.0	1.08

Synthesis Procedure:

Poly(styrene-b-ethylene oxide) diblock copolymer is prepared by living anionic polymerization. Following are the 2 possible routes that were used to synthesize SEO. The scheme of the reaction is illustrated below: The obtained polymer chains bear a terminal OH group.

Characterization:

The molecular weight and polydispersity index (PDI) of the block copolymer are characterized by size exclusion chromatography (SEC). The composition of the block copolymer was calculated from ¹H-NMR by comparing the peak area of the phenyl polystyrene protons between 6.4 to 7.2 ppm and the ethylene oxide protons at 3.65 ppm.

Solubility: The polymer is soluble in THF (at 35 °C), CHCl₃, benzene, toluene, dioxane. Low molecular weight SEO with high contents of the polyethylene oxide block can also be solubilized in methanol and water.

Purification:
Purification of the obtained polymer was carried out rigorously as follows to ensure the removal of the catalyst side product:
1. Dissolved the polymer in CHCl3 and wash with de-ionized distilled water to remove the any soluble organic catalyst side product.
2. Polymer extracted from water with chloroform.
3. Polymer solution in CHCl3 was dried over anhydrous sodium sulfate.
4. Solution filtered and than passed through a column packed with basic Al₂O₃ .
5. Solution concentrated on rota-evaporator
6. Solution precipitated in cold diethyl ether.
7. Dried under vacuum for 48h at 38 ᵒC.

¹H NMR spectrum of the sample
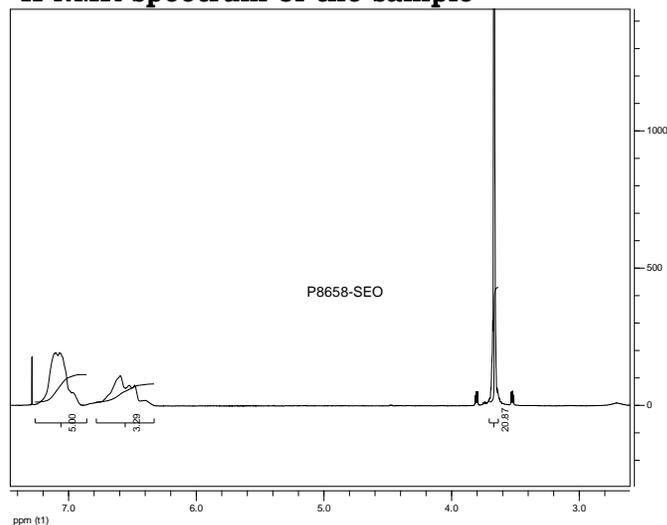
SEC profile of the block copolymer
P8658-SEO
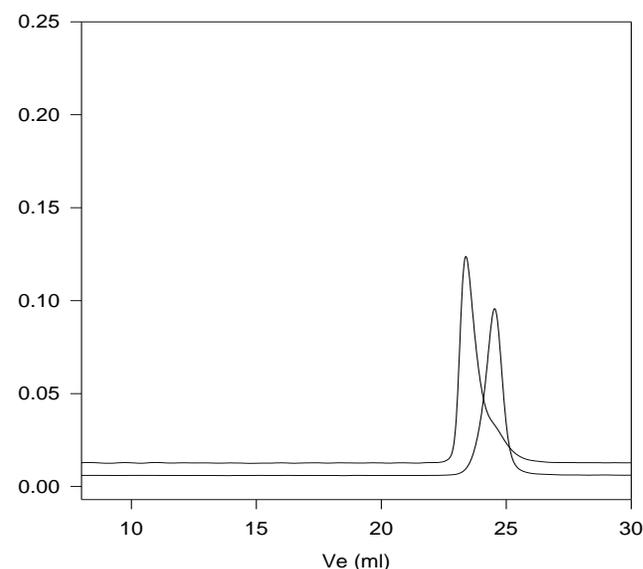
Size exclusion chromatography of poly(styrene-b-ethylene oxide)

—— Poly(styrene), Mₙ=40000, Mw=42000, PI=1.06

—— Block Copolymer PSt(40000)-b-PEO(53000), PI=1.08
Composition from ᴴ NMR