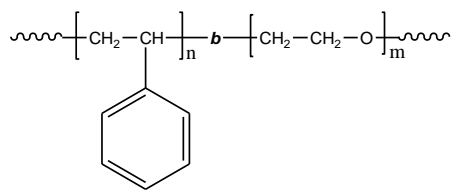


Sample Name: Poly(styrene-b-ethylene oxide)

Sample #: P8399P-SEO

Structure:



Composition:

Mn x 10 ³ S-b-EO	PDI
18.0-b-7.5	1.05

Synthesis Procedure:

Poly(styrene-b-ethylene oxide) diblock copolymer is prepared by living anionic polymerization.

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:

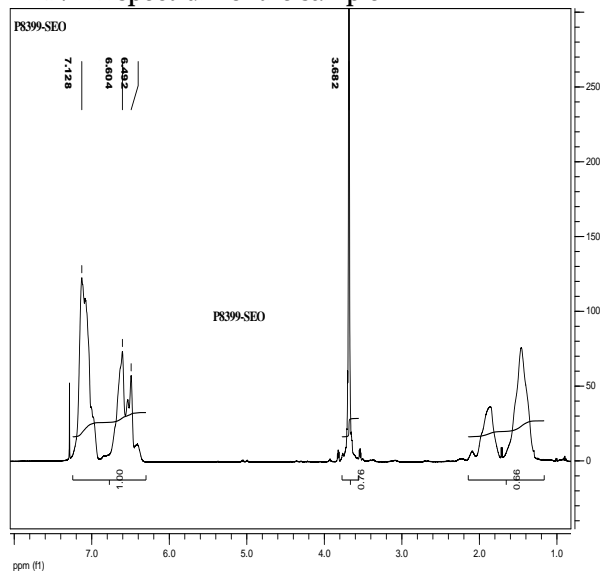
The polymer is soluble in THF (at 35 °C), CHCl₃, benzene, toluene, dioxane. Low molecular weight SEO with high contents of the polyethylene oxide block can also be solubilized in methanol and water.

Purification

Purification of the obtained polymer was carried out rigorously as follows to ensure the removal of the catalyst side product:

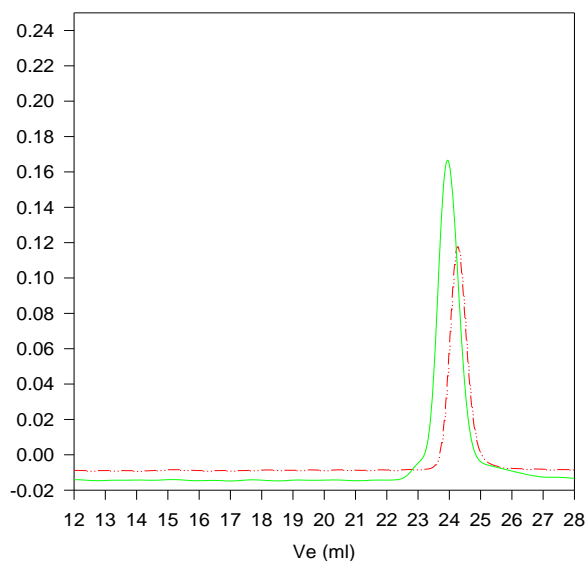
1. Dissolved the polymer in CHCl₃ and wash with de-ionized distilled water to remove the any soluble organic catalyst side product.
2. Polymer extracted from water with chloroform.
3. Polymer solution in CHCl₃ was dried over anhydrous sodium sulfate.
4. Solution filtered and than passed through a column 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°C.

¹H NMR spectrum of the sample



SEC profile of the block copolymer

P8399-SEO



Size exclusion chromatography of poly(styrene-b-ethylene oxide)

--- Poly(styrene), M_n=18000, M_w=19000, PI=1.06
— Block Copolymer PSt(18000)-b-PEO(7500), PI=1.05
The composition determined from HNMR.

Thermal analysis of the sample# P8399P-SEO

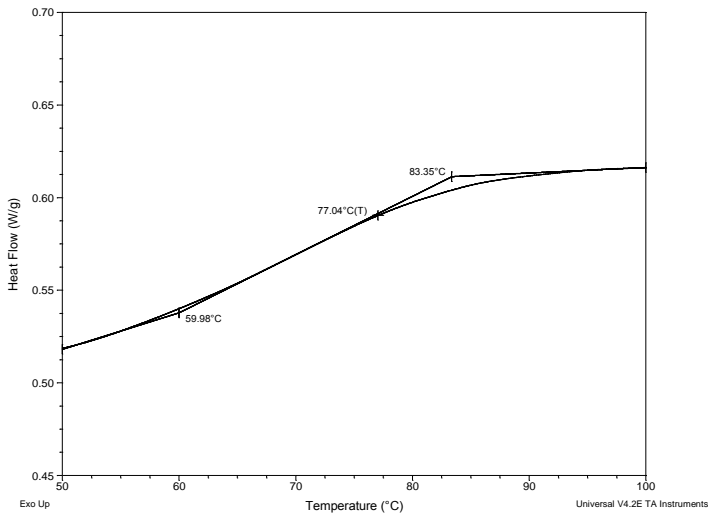
Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of 20°C/min. The midpoint of the slope change of the heat flow plot of the second heating scan was considered as the glass transition temperature (T_g).

Thermal analysis results at a glance

For PS block T_g : 77°C		
For PEO block		
T_g : Not distinct	T_m : 42°C	T_c : -41°C

Thermogram for the sample

For PS block



Melting and crystallization curve for the PEO block

The melting temperature (T_m) was taken as the maximum of the endothermic peak where as the crystallization temperature (T_c) was considered as the minimum of the exothermic peak.

