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

Sample #: P18716B-SEO

Structure:

Composition:

Mn x 10^3 S-b-EO	PDI
1.6-b-6.0	1.10

Synthesis Procedure:

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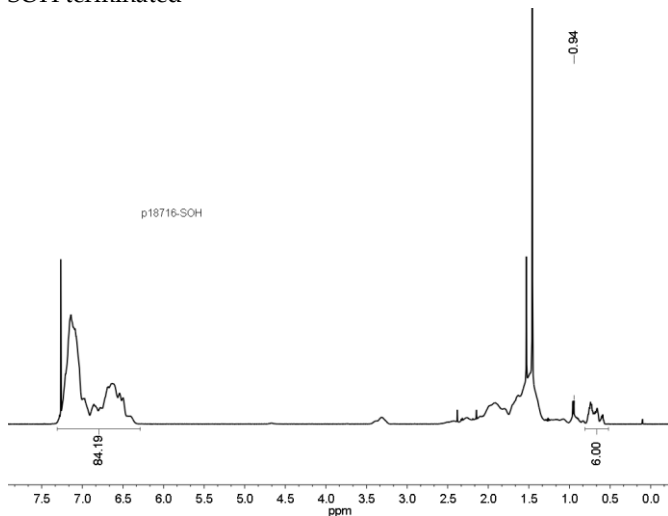
Characterization:

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.
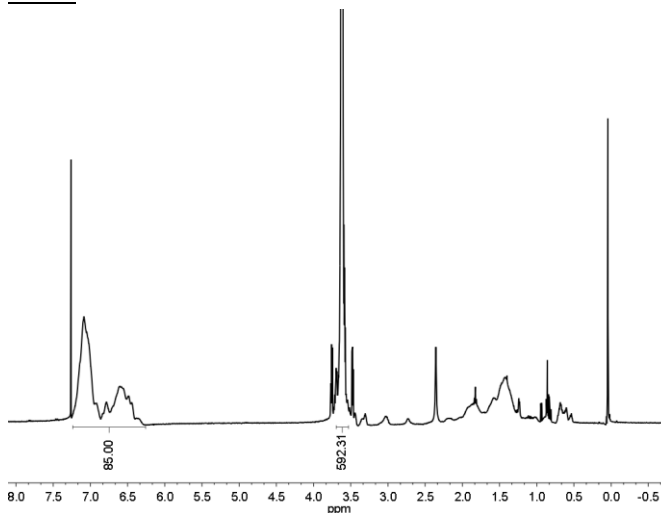
Solubility:

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.

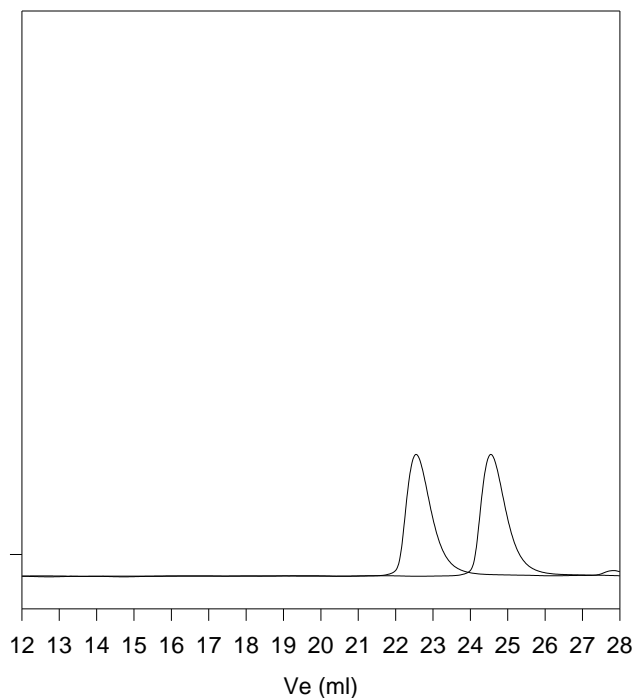### 1H NMR spectrum of the sample

SOH terminated

SEC profile of the block copolymer

P18716B-SEO

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

Poly(styrene), M_n=1600, M_w=1800, PI=1.10
Block Copolymer PSt(1600)-b-PEO(6000), PI=1.10
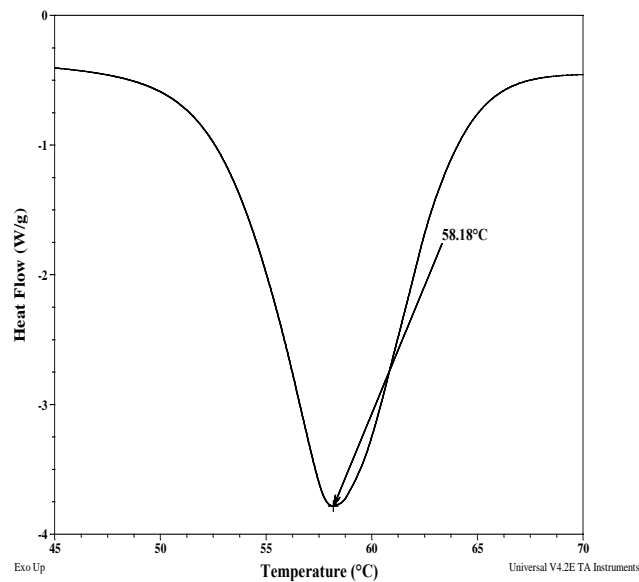The composition determined from HNMR.

Thermal analysis of the sample# P18716B-SEO

Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of 10°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: Not distinct		
For PEO block		
T_g: Not distinct	T_m: 58 °C	T_c: 19 °C

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.

Crystallization curve for PEO block:

Melting curve for PEO block: