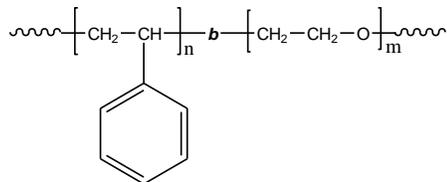


## Sample Name: Poly(styrene-b-ethylene oxide)

Sample #: P11215C-SEO

### Structure:



### Composition:

$M_n \times 10^3$ S-b-EO	PDI
20.5-b-7.5	1.09

### Synthesis Procedure:

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

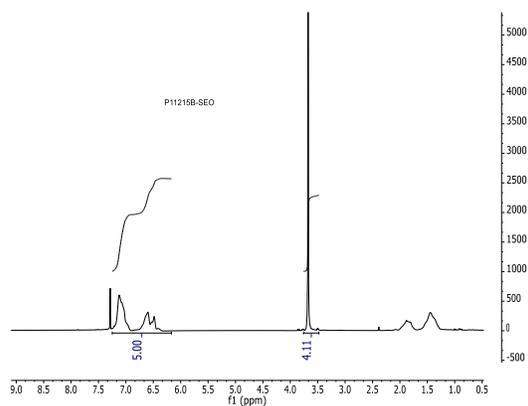
### Characterization:

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  $^1\text{H-NMR}$  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),  $\text{CHCl}_3$ , benzene, toluene, dioxane. Low molecular weight SEO with high contents of the polyethylene oxide block can also be solubilized in methanol and water.

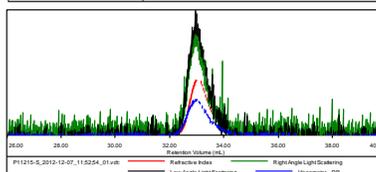
## $^1\text{H}$ NMR spectrum of the sample



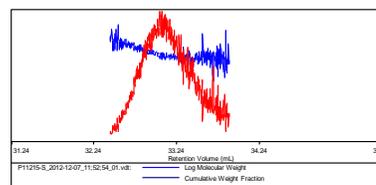
## SEC profile of the block copolymer

Sample ID: P11215-S

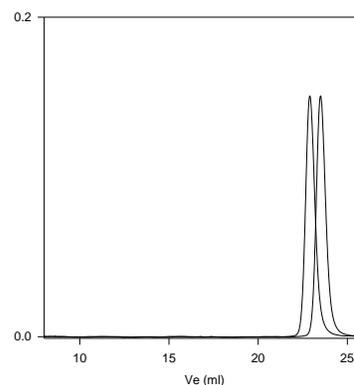
Concentration (mg/mL)	0.6212
Sample dn/dc (mL/g)	0.1850
Method File	PS80K-Dec-2012-0000.v cm
Column Set	3x PL 1113-6300
System	System 1



Sample	$M_n$ (Da)	$M_w$ (Da)	$M_p$ (Da)	$M_w/M_n$	IV (dL/g)
P11215-S_2012-12-07_11:52:54_01.v dt	20,709	21,787	21,964	1.052	0.2449



P11215C-SEO



Size Exclusion Chromatography:

- Polystyrene,  $M_n=20,500$ ,  $M_w=21,000$ ,  $PI=1.05$
- Block Copolymer Polystyrene-b-Poly(ethylene oxide)  
 $M_w: PS(20,500)-b-PEO(7,500)$ ,  $PI=1.09$

### Thermal analysis of the sample# P11215C-SEO

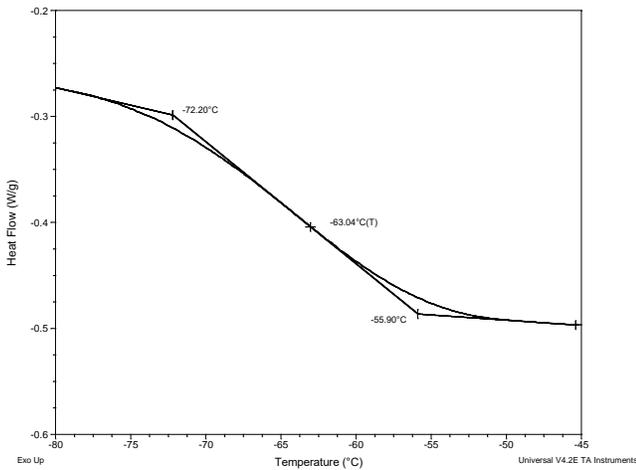
Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of 20°C/min. The midpoint of the slope change of the heat flow plot of the second heating scan was considered as the glass transition temperature ( $T_g$ ).

### Thermal analysis results at a glance

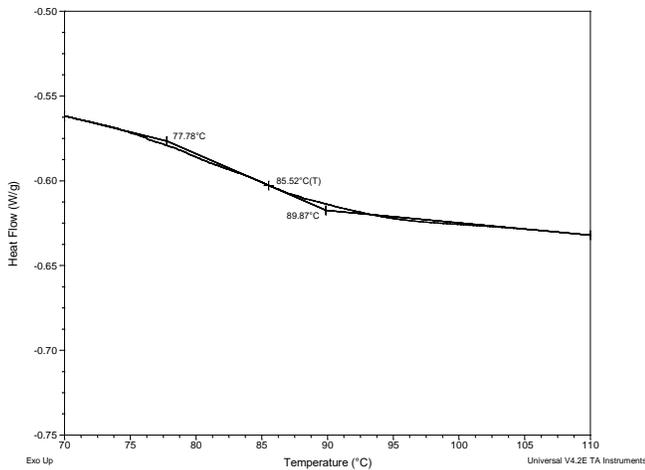
<b>For PS block <math>T_g</math>: 86°C</b>		
<b>For PEO block</b>		
$T_g$ : -63°C	$T_m$ : 48°C	$T_c$ : -35°C

### Thermogram for the sample

#### For PEO block:



#### 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.

