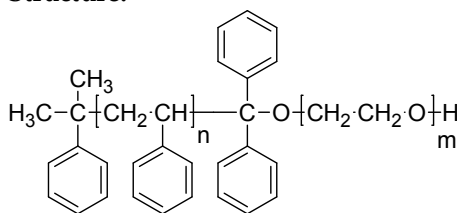


Sample Name: Poly(styrene-b-ethylene oxide)  
**Cleavable**

Sample #: P5915-SEOCleavable

**Structure:**



**Composition:**

Mn x 10 <sup>3</sup> S-b-EO	PDI
18.5-b-3.0	1.15

**Synthesis Procedure:**

Poly(styrene-b-ethylene oxide) diblock copolymer is prepared by anionic polymerization. For the details process please see the reference:

1. Synthesis of poly(styrene-block-ethylene oxide) copolymers by anionic polymerization and acid cleavage into its constituent homopolymers for the formation of ordered nanoporous thin films: e-polymer, 2008, 094, 1618.

**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 <sup>1</sup>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.

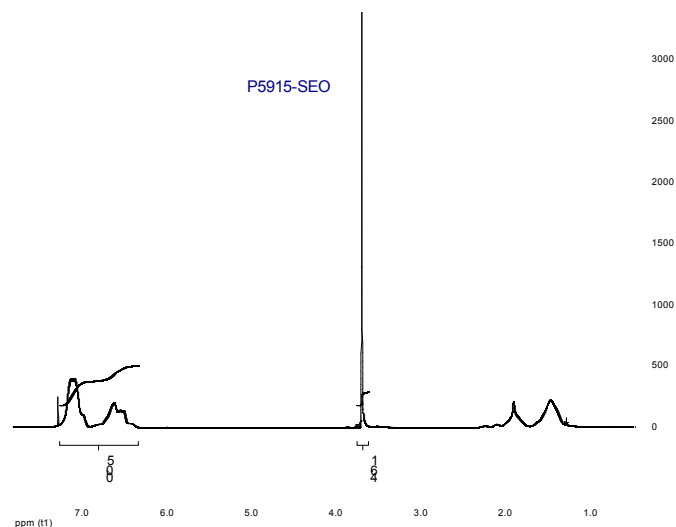
**Solubility:**

The polymer is soluble in THF (at 35 °C), CHCl<sub>3</sub>, benzene, toluene, dioxane. Low molecular weight SEO with high contents of the polyethylene oxide block can also be solubilized in methanol and water.

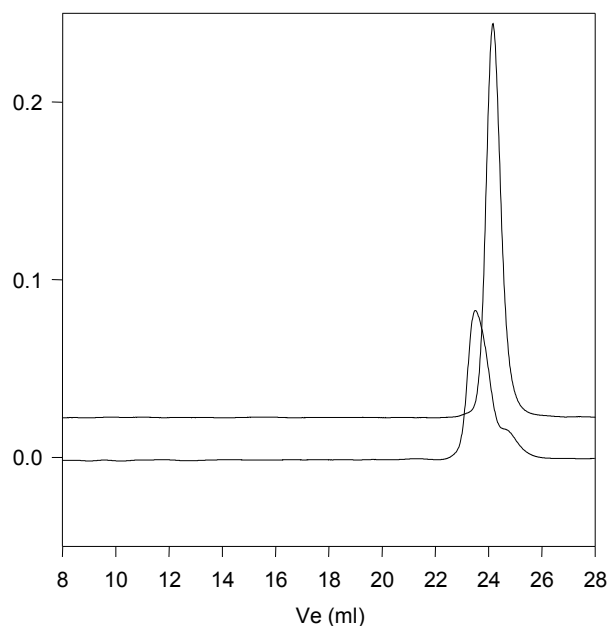
**Quick test for the presence of cleavage group at the junction:**

Prepare the solution of polymer in toluene (10mg in 1 ml of toluene) and add a drop of trifluoroacetic acid. Immediately the color turns yellow. This indicates the formation of phenyl moiety charge with cation (Phenyl-C<sup>+</sup>) with the liberation of PEO block. This test rapidly confirms the cleavage of PEO block from the polystyrene block at the junction.

**<sup>1</sup>H NMR of the polymer:**



**SEC profile of the block copolymer**  
**P5915-SEO**



Size exclusion chromatography of poly(St-b-EO) cleavage polymer

- OH terminated PS, M<sub>n</sub>=18500, M<sub>w</sub>=19500, Mw/Mn=1.05
- Poly(S-b-EO): PS(18,500)-b-EO(3,000) Mw/Mn=1.15

## Thermal analysis of P5915-SEOCleavable

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 ( $T_g$ ).

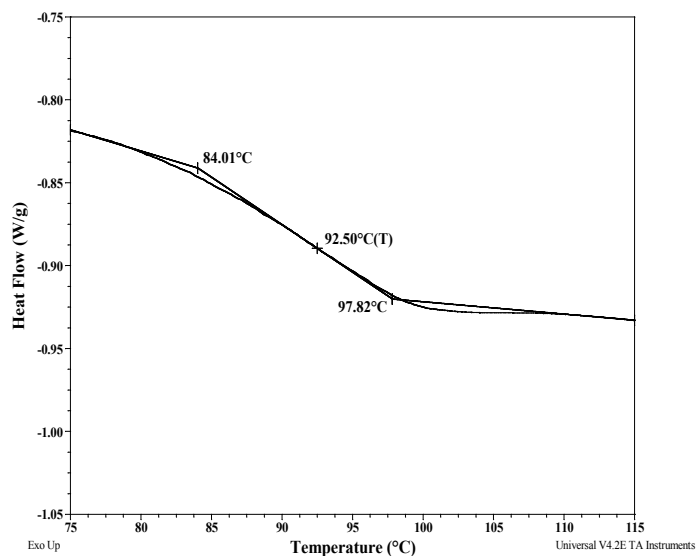
### Melting and crystallization curve for the sample

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.

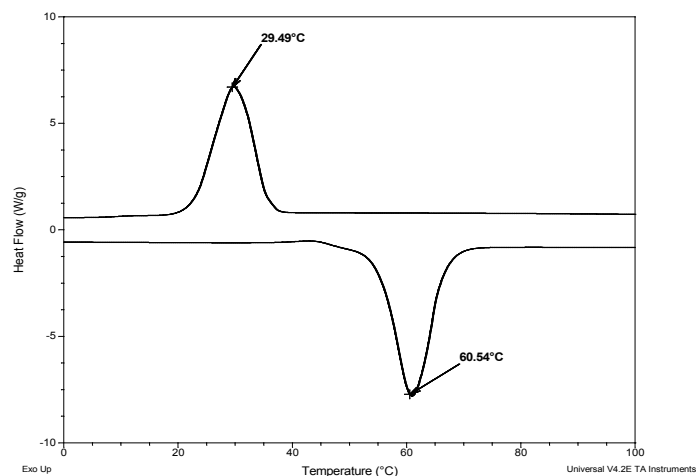
### Thermal analysis results at a glance

Sample	$T_m$ (°C)	$T_c$ (°C)	$T_g$ (°C)
EO	61	29	-65
PS	-	-	95
SEO cleavage	46	35	PS: 93 EO: Not distinct

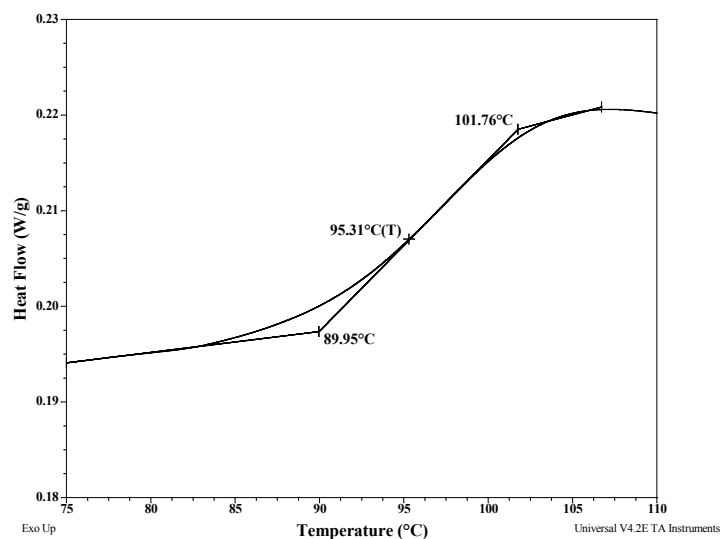
### Thermogram for the PS block



## Thermogram of poly (ethylene glycol) methyl ether (Mn≈5000)



## Thermogram of polystyrene (Mn≈20800)



## Thermogram for SEO cleavage sample #P8784

