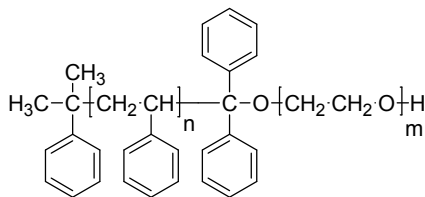


Sample Name: Poly(styrene-b-ethylene oxide)
Cleavable

Sample #: P8784-SEOCleavable

Structure:



Composition:

Mn x 10 ³ S-b-EO	PDI
19.0-b-4.5	1.10

Synthesis Procedure:

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 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.

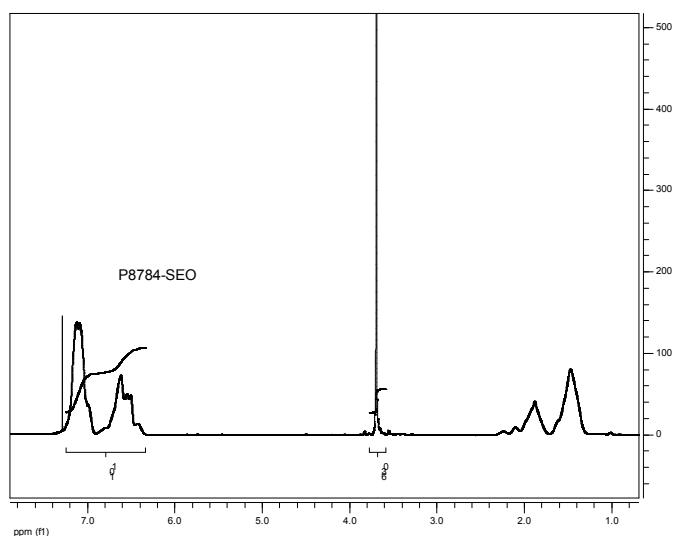
Solubility:

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.

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

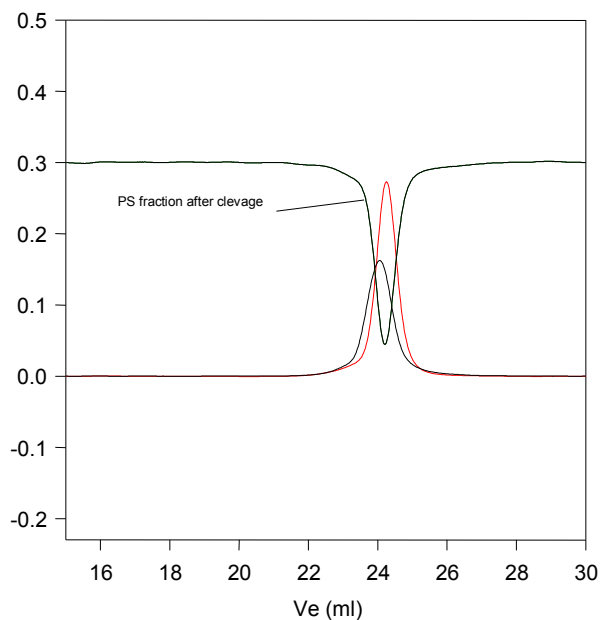
Prepare the solution of polymer in toluene (10mg in 1 ml of toluene) and add a drop of trifluoroacetic acid. Immediately the color turns yellow. This indicates the formation of phenyl moiety charge with cation (Phenyl-C⁺) with the liberation of PEO block. This test rapidly confirms the cleavage of PEO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

¹H NMR of the polymer:



SEC profile of the block copolymer

P8784-SEOCleavable



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

— PS, M_n=19000, M_w=20500, Mw/Mn=1.10

— Poly(S-b-EO): PS(19000)-b-EO(4500) Mw/Mn=1.10

Thermal analysis of P8784--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).

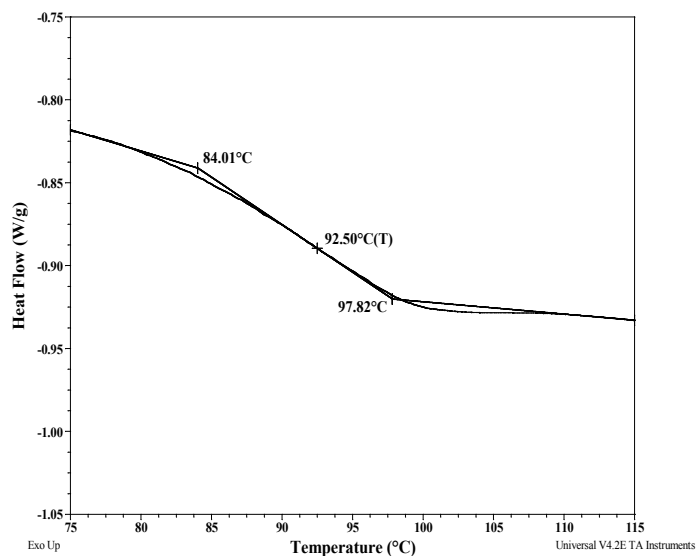
Melting and crystallization curve for the sample

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.

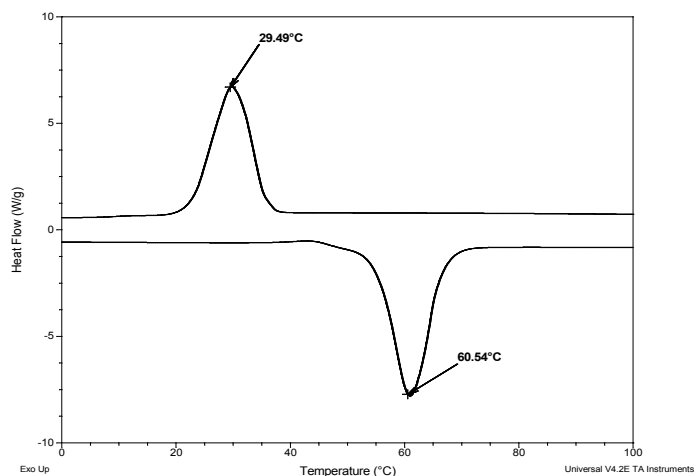
Thermal analysis results at a glance

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

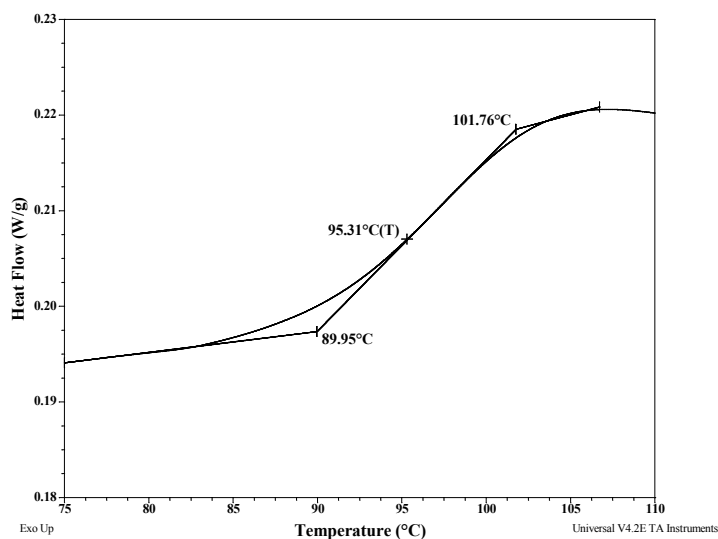
Thermogram for the PS block



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



Thermogram of polystyrene (Mn≈20800)



Thermogram for SEOCleavable sample #P8784

