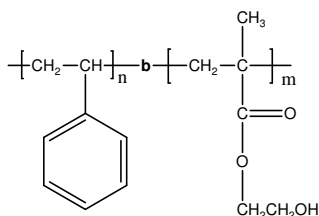


Sample Name:

**Poly(styrene-*b*-hydroxyethyl methacrylate)**

Sample #: **P19752A-SHEMA**

**Structure:**



**Composition:**

| Mn × 10 <sup>3</sup><br>S-b-HEMA | Mw/Mn (PDI) |
|----------------------------------|-------------|
| 59.0-5.0                         | 1.10        |

**Glass transition temperature at a glance**

| T <sub>g</sub> for PS block   | 99 °C        |
|-------------------------------|--------------|
| T <sub>g</sub> for HEMA block | Not distinct |

**Synthesis Procedure:**

Poly(styrene-*b*-hydroxy ethyl methacrylate) was synthesized by living anionic polymerization by sequence addition of styrene followed by trimethylsiloxyl ethyl methacrylate (HEMA-TMS) and deprotection of the OH group.

**Characterization:**

An aliquot of the polystyrene block was terminated before addition of trimethylsiloxyl ethyl methacrylate and analyzed by size exclusion chromatography (SEC) to obtain the molecular weight and polydispersity index (PDI).

SEC analysis of the obtained block copolymer in THF in presence of triethyl amine as eluent resulting in an ambiguity of the result because some of the trimethylsiloxyl ethyl methacrylate units are deprotected to convert hydroxy ethyl methacrylate.

The SEC analysis of the final polymer is carried out after protecting OH groups of hydroxy ethyl methacrylate to acetate group was treated with acetic anhydride in presence of pyridine. The SEC analysis of the obtained polymer gives more reliable results.

The final block copolymer composition by <sup>1</sup>H-NMR spectroscopy in CdCl<sub>3</sub> also yield the uncertainty of the analysis because of poor solubility of poly HEMA block in CdCl<sub>3</sub>. The composition of the obtained polymer therefore, carried out in CdCl<sub>3</sub> after protecting the OH group with acetic anhydride by comparing the peak area of the styrene protons at 6.3-7.2 ppm with the

peak area of ethyl methacrylate at 4.2-4.17 ppm. Block copolymer PDI is determined by SEC.

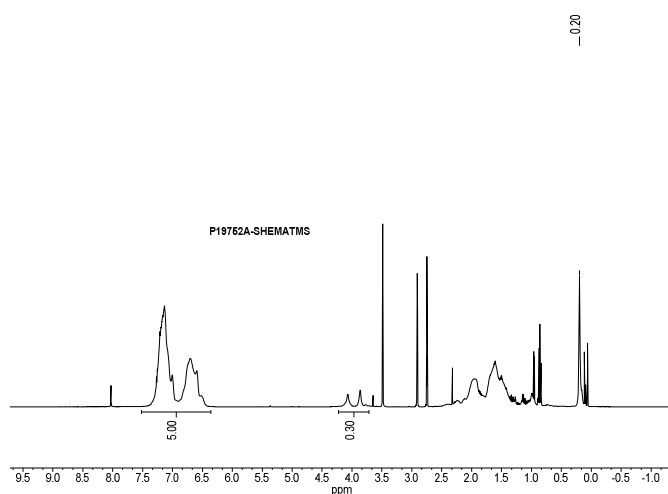
**Thermal analysis:**

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<sub>g</sub>).

**Solubility:**

Poly(styrene-*b*-hydroxyethyl methacrylate) is soluble in DMF, and precipitated into hexanes.

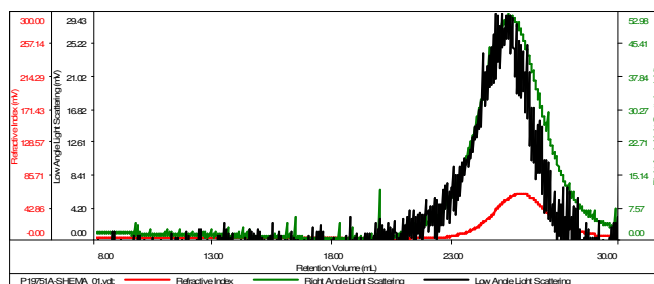
**<sup>1</sup>H NMR spectrum of the Polymer in CdCl<sub>3</sub>:**



**SEC elugram of the block copolymer:**

**Sample ID: P19752A-SHEMA**

|                       |                             |
|-----------------------|-----------------------------|
| Concentration (mg/mL) | 4.0085                      |
| Sample dn/dc (mL/g)   | 0.1750                      |
| Method File           | PS80K-4Aug.st.2016-0000.vcm |
| Column Set            | 3x PL 1113-6300             |
| Solvent               | THF                         |



| Sample               | Mh (Da) | Mw (Da) | Mw/Mh | IV (dL/g) | Mp (Da) |
|----------------------|---------|---------|-------|-----------|---------|
| P19751A-SHEMA_01.vdt | 64,250  | 71,178  | 1.108 | 0.2289    | 58,341  |