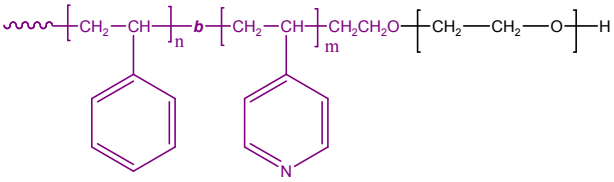
Sample Name:
Poly(styrene-b-4-vinyl pyridine-ethylene oxide)

Sample #: P10205-S4VPEO

Structure:

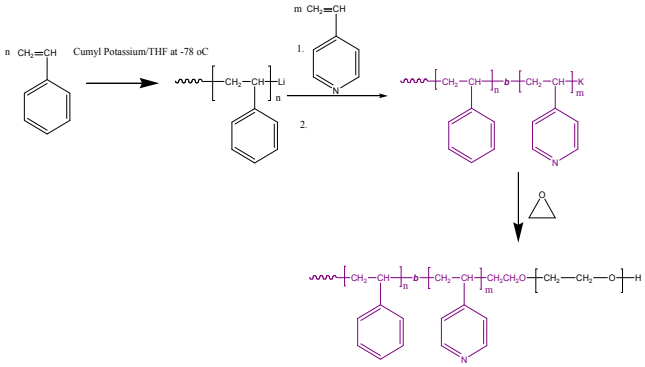


Composition:

Mn x 10^3 S-b-4VP-b-EO	PDI
24.0-b-175.0-b-28.0	1.4

***Synthesis Procedure*:**

Poly(styrene-b-4-vinyl pyridine-ethylene oxide) triblock copolymer is prepared by living anionic polymerization. The triblock is synthesized by successive addition of monomer using cumyl potassium as initiator. For further details please see the following scheme.



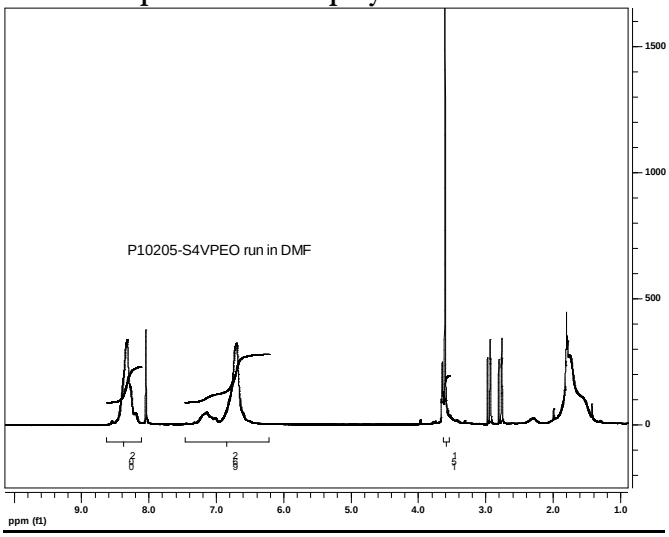
Characterization:

An aliquot of the anionic polystyrene block was terminated before addition of 4VP and analyzed by size exclusion chromatography (SEC) to obtain the molecular weight and polydispersity index (PDI). The Block copolymer composition was then calculated from ^{1}H-NMR spectroscopy by comparing the peak area of the 4VP proton at 8.2 ppm with the peak area of the aromatic protons of polystyrene at 6.3-7.2 ppm and EO protons at 3.6 ppm. The composition of the block copolymer can also be determined by titration in acetic acid/HClO4 using crystal violet indicator. Copolymer PDI is determined by SEC. Product purified by stirring in THF that will remove traces amount of any homopolystyrene

Solubility:

Poly(styrene-b-4 vinylpyridine-b-ethylene oxide) is soluble can be solubilized in THF-methanol mixture, ethanol depending on its composition. The polymer readily precipitates from hexanes, ether and water.

^{1}H-NMR Spectrum of the polymer



SEC of the Polymer:

References:

1. S. K. Varshney, X. F. Zhong and A. Eisenberg *Macromolecules* **1993**, 26, 701-706.
2. Gohy, J.-F., Lohmeijer, B Varshney S,K, Decamps B., Leroy E., Boileau S., Schubert U. S., *Stimuli-responsive aqueous micelles from an ABC metallo-supramolecular triblock copolymer*, Macromolecules 2002, 35, 9748-9755.
3. Gohy, J.-F., Mores S., Varshney S. K., Jerome, R., *Self-organization of water-soluble complexes of a poly(2-vinylpyridinium)-block-poly(ethylene oxide) diblock and a fluorinated anionic surfactant*, Macromolecules 2003, 36, 2579-2581.
4. Leil L., Gohy J.-F., Willet N., , Zhang J.-X., Varshney S., Jerome R., *Tuning of the morphology of core-shell-corona aqueous micelles: I. sphere–to-cylinder transition*, Macromolecules 2004, 37, 1089-1094.
5. Jean-Francois Gohy, Bas G. G. Lohmeijer, Sunil K. Varshney, and Ulrich S. Schubert,Covalent vs Metallo-supramolecular Block Copolymer Micelles" Macromolecules 2002, 35, 7427-7435.

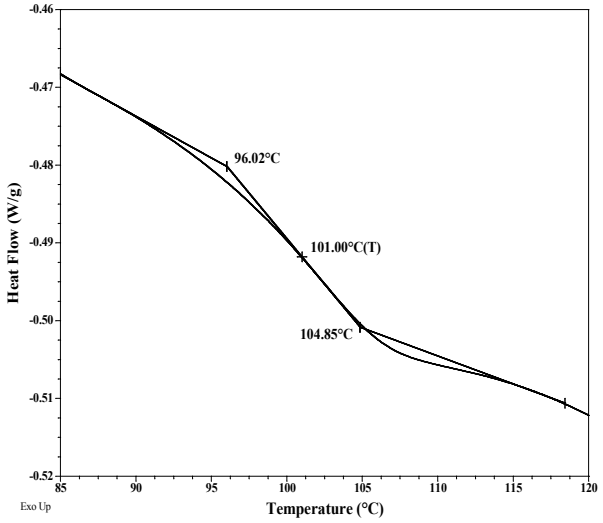
Thermal Analysis of the sample P10205-S4VPEO

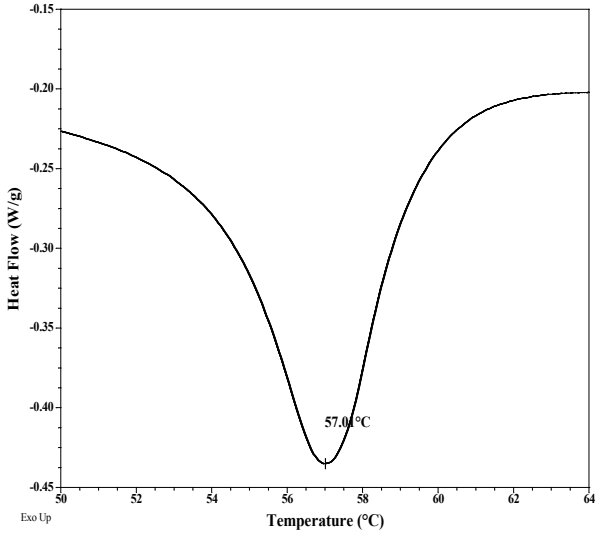
Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of 10^{o}C/min.The midpoint of the slope change of the heat flow plot of the second heating scan was considered as the glass transition temperature (T_g).

Thermal analysis results at a glance

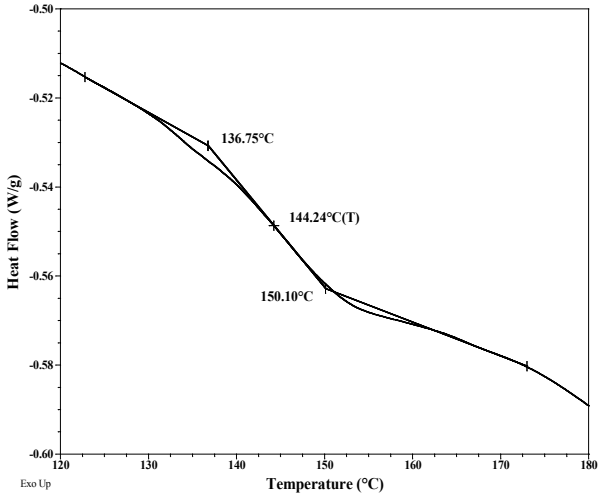
For PS block: T_g: 101 ^{o}C		**For 4VP block**: T_g: 144 ^{o}C
For PEO block		
T_g: Not distinct	T_m: 57 ^{o}C	T_c: 07 ^{o}C

Thermogram for PS block:

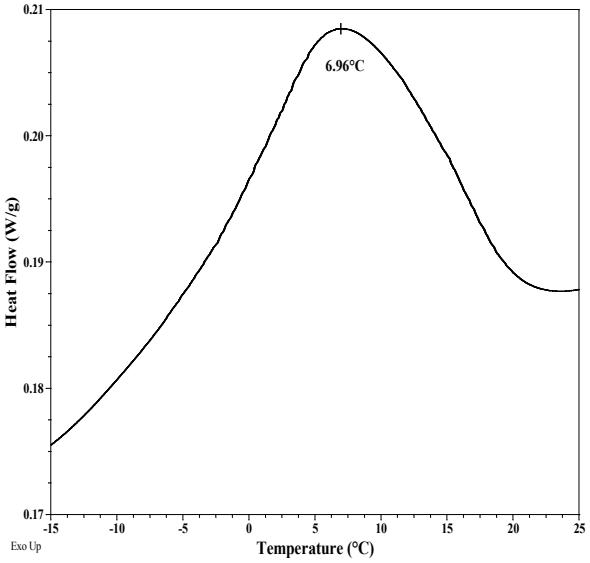




Thermogram for 4VP block:



Crystallization curve For PEO block



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.

Melting curve for PEO block