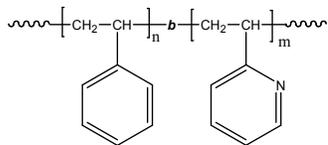


¹H-NMR Spectrum of the Polymer

Sample Name: Poly(styrene-b-2-vinyl pyridine)

Sample #: P10848-S2VP

Structure:

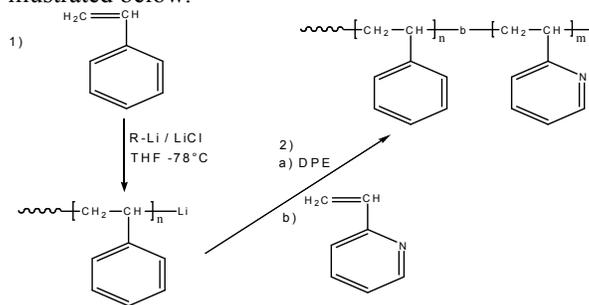


Composition:

Mn x 10 ³ S-b-2VP	PDI
68.5-b-26.0	1.10
T _g for 2VP block: Not distinct 95°C for 100k homopolymer)	T _g for PS block: 104 °C

Synthesis Procedure:

Poly(styrene-b-2-vinyl pyridine) is prepared by living anionic polymerization in THF at -78 °C in the presence of LiCl as an additive. Polystyrene macroanions were end capped with a unit of diphenyl ethylene (DPE) before adding 2-vinylpyridine (2VP) monomer. For further details please see our published articles^{1,2} The scheme of the reaction is illustrated below:



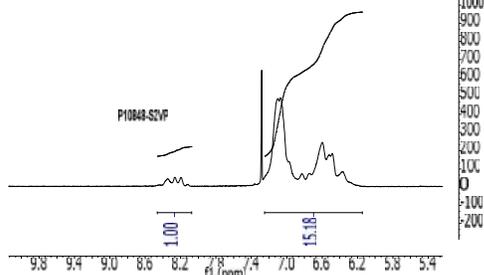
Characterization:

An aliquot of the anionic polystyrene block was terminated before addition of 2VP and analyzed by size exclusion chromatography (SEC) to obtain the molecular weight and polydispersity index (PDI). The Block copolymer composition was then calculated from ¹H-NMR spectroscopy by comparing the peak area of the 2VP proton at 8.2 ppm with the peak area of the aromatic protons of polystyrene at 6.3-7.2 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.

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_g).

Solubility:

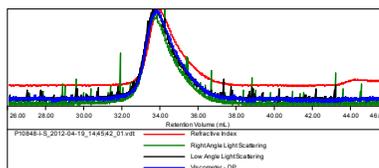
Poly(styrene-b-2 vinylpyridine) is soluble in THF, toluene, and CHCl₃. The diblock copolymer can also be solubilized in methanol, ethanol depending on its composition. The polymer readily precipitates from hexanes, ether and water.



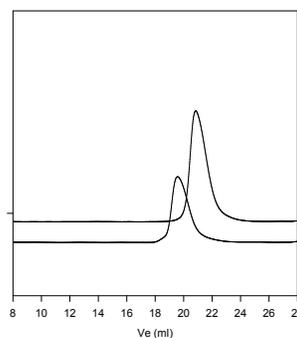
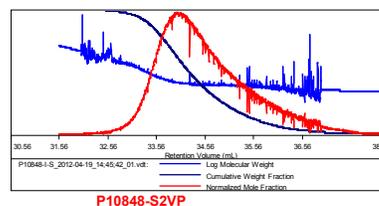
SEC:

Sample ID: P10848-I-S

Concentration (mg/mL)	1.1391
Sample dn/dc (mL/g)	0.1850
Method File	PS80-APR-2012-0000.vcm
Column Set	3x PL 1113-6300
System	System 1

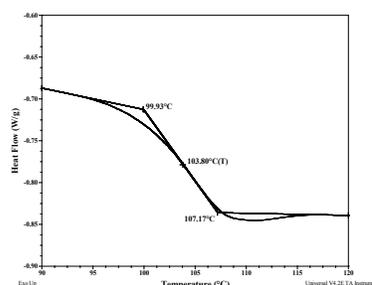


Sample	Mn (Da)	Mw (Da)	Mp (Da)	Mw/Mn	IV (dL/g)
P10848-I-S_2012-04-19_14:45:42_01.vcl	68,692	73,542	72,972	1.071	0.4667



Size exclusion chromatography of poly(styrene-b-2-vinyl pyridine)
— Polystyrene, M_n=68,500 Mw: 73,500 PI=1.07
— Polystyrene(68,500)-b-Poly 2VP(26,000), PI=1.10

DSC thermogram for the polymer:



References:

- (1). S. K. Varshney, X. F. Zhong and A. Eisenberg *Macromolecules*, **1993**, 26, 701-706.
- (2). Z.Gao, S. K. Varshney, S. Wong, A. Eisenberg *Macromolecules*, **1994**, 27, 7923-7927.