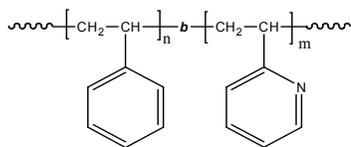


## Sample Name: Poly(styrene-b-2-vinyl pyridine)

Sample #: P9256-S2VP

Structure:



### Composition:

Mn x 10 <sup>3</sup> S-b-2VP	PDI
1100.0-b-55.0	1.19
T <sub>g</sub> for 2VP block	Not distinct
T <sub>g</sub> for PS block	106 °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<sup>1,2</sup>

### 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 further calculated from <sup>1</sup>H-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/HClO<sub>4</sub> using crystal violet indicator. Copolymer PDI is also determined by SEC.

### Thermal analysis

Thermal analysis of the samples was carried out using a differential scanning calorimeter (TA Q100) at a heating rate of 15°C/min. The inflection glass transition temperature (T<sub>g</sub>) has been considered.

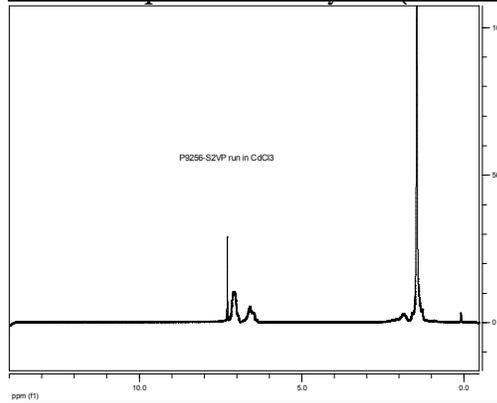
**Solubility:** Polymer is soluble in THF, toluene, and CHCl<sub>3</sub>.

### Purification

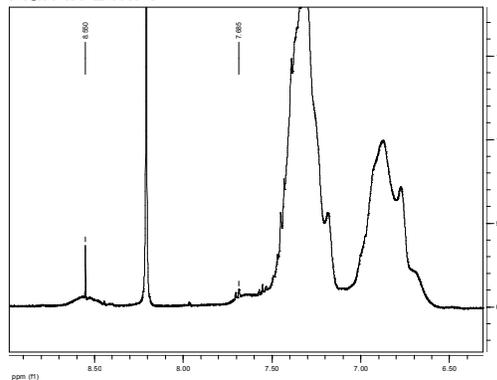
*Purification of the obtained polymer was carried out rigorously as follows to ensure the removal of the catalyst side product:  
After Soxhlet the polymer using cyclohexane to remove any traces amount of homopolystyrene.*

1. Dissolved the polymer in CHCl<sub>3</sub> and wash with de-ionized distilled water to remove the any soluble organic catalyst side product.
2. Polymer extracted from water with chloroform.
3. Polymer solution in CHCl<sub>3</sub> was dried over anhydrous sodium sulfate.
4. Solution filtered and then passed through a column packed with basic Al<sub>2</sub>O<sub>3</sub>.
5. Solution concentrated on rota-evaporator
6. Solution precipitated in cold methanol and redissolved in dioxane and freeze dried.
7. Final dried under vacuum for 48h at 50°C

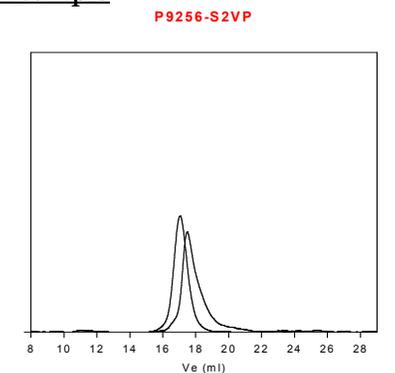
## <sup>1</sup>H-NMR Spectrum of Polymer (run in CdCl<sub>3</sub>)



### Run in DMF:



## SEC of Sample

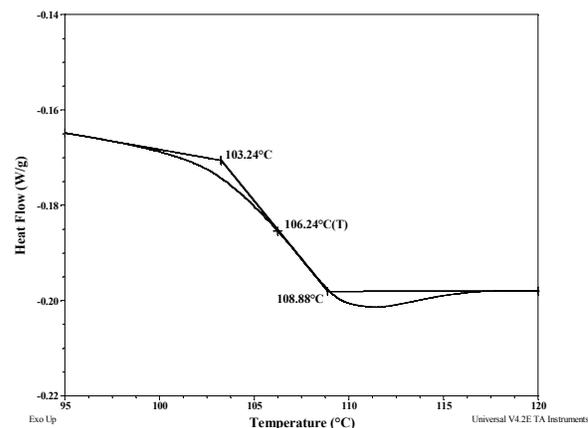


Size exclusion chromatography of poly(styrene-b-2-vinyl pyridine)

— Polystyrene, M<sub>n</sub>=1100,000 Mw= 1210,000 PI=1.10

— Polystyrene(1100,000)-b-Poly(2-vinyl pyridine)(55,000),PI=1.19  
The elution counts for the diblock was found lower than Polystyrene block this may be due to some adsorption of polymer in the columns used for the analysis.

## DSC thermogram for 2VP block:



## 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.