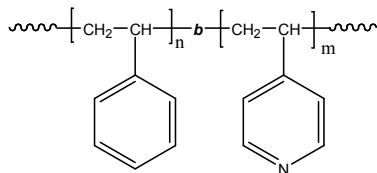


**Sample Name: Poly(styrene-b-4-vinyl pyridine)**

**Sample #: P9801-S4VP**

**Structure:**



**Composition:**

Mn x 10 <sup>3</sup> PS-b-4VP	PDI
240.0-b-20.0	1.10
T <sub>g</sub> for PS block: 100°C	T <sub>g</sub> for 4VP block: 144°C

**Synthesis Procedure:**

Poly(styrene-b-4-vinyl pyridine) is prepared by living anionic polymerization in THF or THF-DMF solvent mixtures at -78 °C. Polystyrene macroanions were end capped with a unit of diphenyl ethylene (DPE) before adding 4-vinylpyridine (4VP) 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 4-vinyl pyridine and analyzed by size exclusion chromatography (SEC) in DMF to obtain the molecular weight and polydispersity index (PDI). The block copolymer composition was then calculated from <sup>1</sup>H-NMR spectroscopy by comparing the peak area of the two aromatic 4-VP protons at about 8.5 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 determined by SEC.

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>) of the sample has been considered.

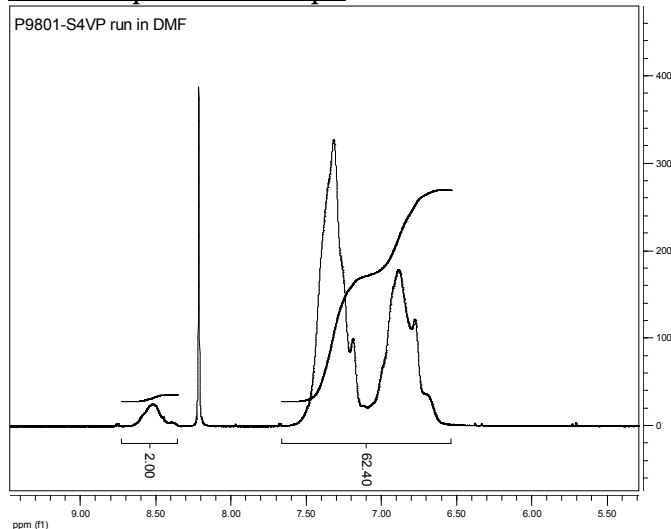
**Solubility:**

Poly(styrene-b-4-vinyl pyridine) is soluble in DMF, CHCl<sub>3</sub>. The polymer can also be solubilized in THF depending on its chemical composition. The polymer readily precipitates from hexanes and diethyl ether.

**Purification of the obtained polymer was carried out rigorously** as follows to ensure the removal of the catalyst side product:

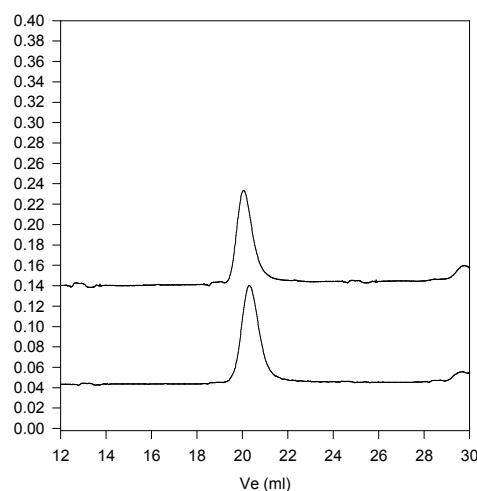
1. Dissolved the polymer in CHCl<sub>3</sub> and wash with de-ionized distilled water to remove the any soluble organic catalyst side product.
2. Polymer extracted from water with chloroform.
3. Polymer solution in CHCl<sub>3</sub> was dried over anhydrous sodium sulfate.
4. Solution filtered and than 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 hexane and redissolved in benzene and freeze dried.
7. Final dried under vacuum for 48h at 50°C.

### **<sup>1</sup>H-NMR Spectrum of Sample**



### **SEC of the polymer:**

**P9801-S4VP**

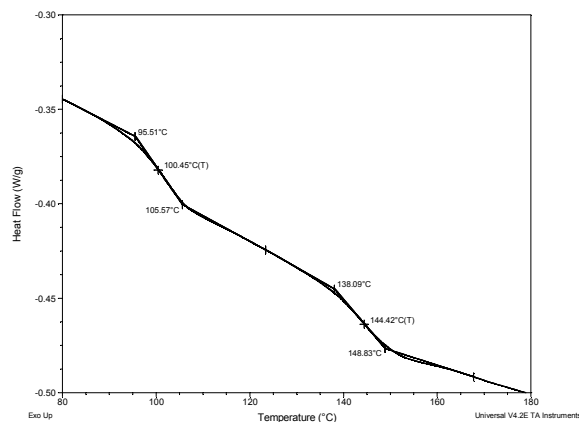


Size exclusion chromatography of P(s-b-4VP) in DMF at 40 °C:

— PS block: M<sub>n</sub>=165,000, M<sub>w</sub>=178,000, PI=1.08

— Block Copolymer PS-4VP (165,000)-b-4VP(21,500), PI=1.10

### **Thermograms of sample:**



### **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.