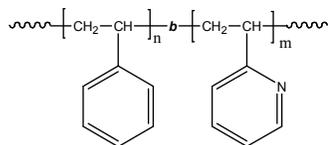


Sample Name: Poly(styrene-b-2-vinyl pyridine)

Electronic Grade –Purified

Sample #: P4627E -S2VP

Structure:

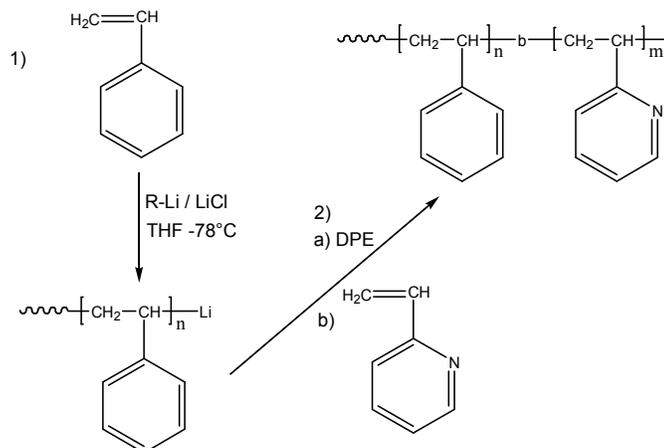


Composition:

Mn x 10 ³ S-b-2VP	PDI
32.5-b-12.0	1.05

Synthesis Procedure:

Poly(styrene-b-2-vinyl pyridine) is prepared by living anionic polymerization in THF at -78°C in the presence of LiCl 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 $^1\text{H-NMR}$ 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_4 using crystal violet indicator. Copolymer PDI is determined by SEC.

Solubility:

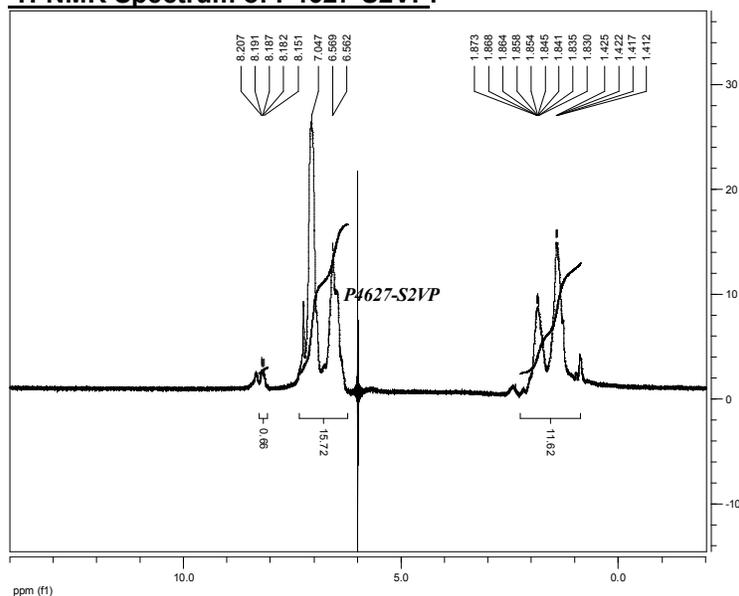
Poly(styrene-b-2 vinylpyridine) is soluble in THF, toluene, and CHCl_3 . The diblock copolymer can also be solubilized in methanol, ethanol depending on its composition. The polymer readily precipitates from hexanes, ether and water.

Purification

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

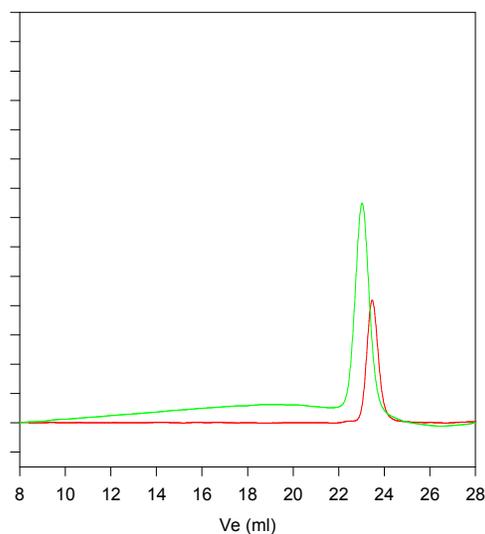
1. Soxhlet the polymer from Cyclohexane to remove any trace amount of Homopolystyrene: Care the product might also solubilize in cyclohexane: soxhlet for 2hr only.
2. Dissolved the polymer in CHCl_3 and wash with de-ionized distilled water to remove the any soluble organic catalyst side product.
3. Polymer extracted from water with chloroform.
4. Polymer solution in CHCl_3 was dried over anhydrous sodium sulfate.
5. Solution filtered and than passed through a column packed with basic Al_2O_3 and than silica .
6. Solution concentrated on rota-evaporator
7. Solution precipitated in cold hexane and redissolved in benzene and freeze dried.
8. Final dried under vacuum for 48h at 50°C .

$^1\text{H-NMR}$ Spectrum of P4627-S2VP:



SEC of Sample :

P4627-S2VP



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

— Polystyrene, $M_n=32500$ $M_w:34000$ $PI=1.05$

— Polystyrene(32500)-b-Poly(2-vinyl pyridine)(12000), $PI=1.05$

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.