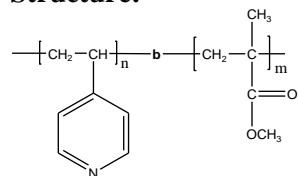


**Sample Name:** Poly(4-vinyl pyridine-b-methyl methacrylate)

**Sample #:** P40608-4VPMMA

**Structure:**

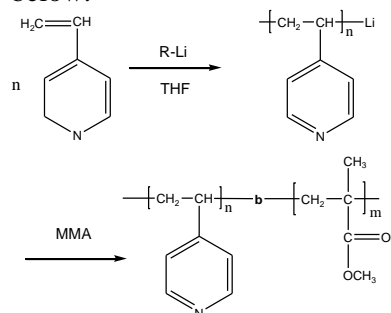


**Composition:**

|  |                                      |
|--|--------------------------------------|
| Mn × 10 <sup>3</sup><br>4VP-b-MMA          | Mw/Mn (PDI)                          |
| 12.0-b-48.0                                | 1.07                                 |
| T <sub>g</sub> for 4VP block: Not distinct | T <sub>g</sub> for MMA block: 118 °C |

**Synthesis Procedure:**

Poly(4-vinyl pyridine-b-methyl methacrylate) is synthesized by living anionic polymerization with sequence addition of 4-vinyl pyridine followed by methyl methacrylate. The reaction scheme is shown below:



**Characterization:**

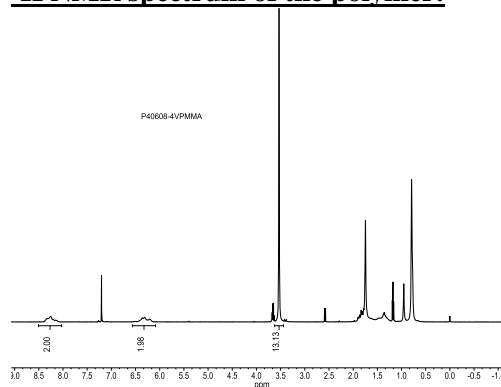
An aliquot of the anionic 4-vinyl pyridine block was terminated before addition of methyl methacrylate and analyzed by size exclusion chromatography (SEC) to obtain the molecular weight and polydispersity index (PDI). The block copolymer composition was then calculated from <sup>1</sup>H-NMR spectroscopy by comparing the peak area of the 4-vinyl pyridine proton peaks at about 8.5 ppm with the methyl methacrylate protons at 3.6 ppm. 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<sub>g</sub>).

**Solubility:**

Polymer is soluble in THF, CHCl<sub>3</sub> and dioxane.

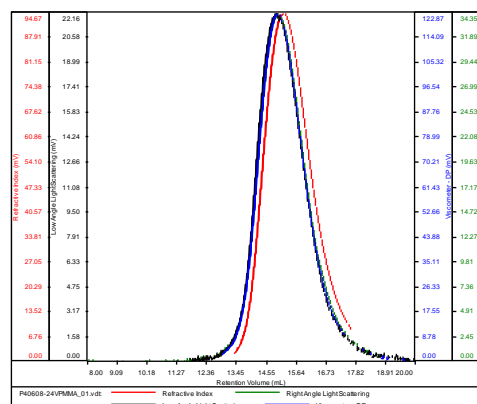
**<sup>1</sup>H NMR spectrum of the polymer:**



**SEC of Sample of the block copolymer:**

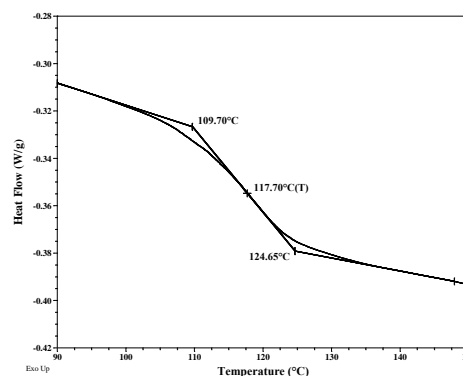
P40608-4VPMMA

|           |                        |
|-----------|------------------------|
| Conc      | 13.3400                |
| dn/dc     | 0.1100                 |
| Solvent   | DMF w 0.023M LiBr      |
| Flow Rate | 0.7000                 |
| Method    | PS80k-May2017-0000.vcm |



| Sample                | MW Number Average | MW Weight Average | MW at Peak | Polydispersity | Intrinsic Viscosity |
|-----------------------|-------------------|-------------------|------------|----------------|---------------------|
| P40608-24VPMMA_01.vdt | 80,122            | 64,304            | 63,124     | 1.070          | 0.2105              |

**DSC thermogram for MMA block:**



**Reference:**

S. K. Varshney, X. F. Zhong and A. Eisenberg  
"Anionic Homopolymerization and Block Copolymerization of 4-Vinylpyridine and Its Investigation by High-Temperature Size-Exclusion Chromatography in N-Methyl-2-Pyrrolidinone" CA Vol 118, 12, 102658 Macromolecules, 1993, 26, 701-706.