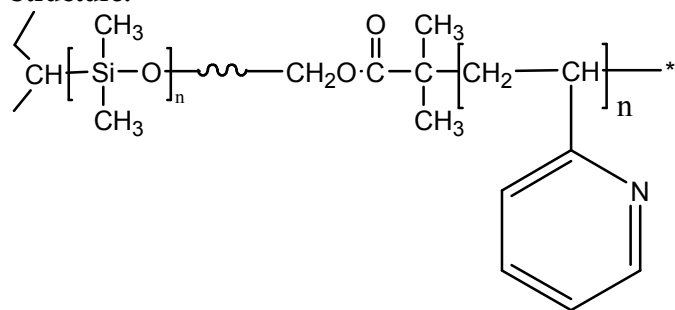


# **Sample Name: Poly(2-vinyl pyridine-b-dimethylsiloxane)**

**Sample #: P5670B-2VPDMS**

**By controlled radical process**

**Structure:**



## **Composition:**

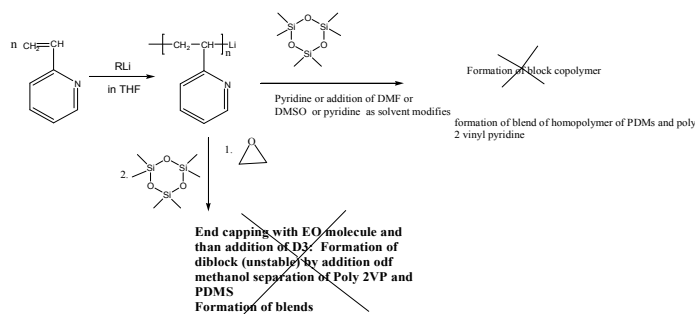
|                                |           |
|--------------------------------|-----------|
| $M_n \times 10^3$<br>2VP-b-DMS | $M_w/M_n$ |
| 0.50-b-2.0                     | 1.18      |

## **Synthesis Procedure:**

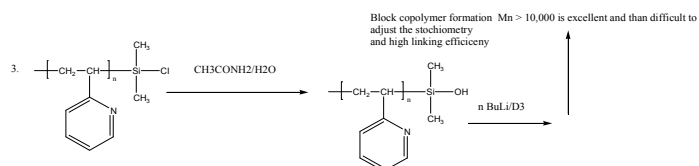
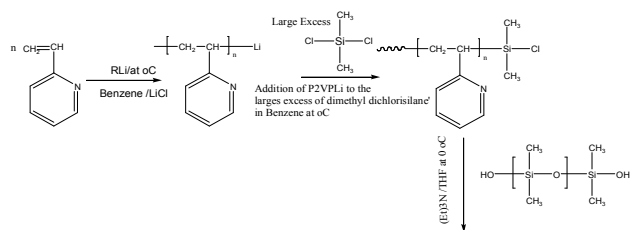
Poly(2-vinyl pyridine-b-dimethylsiloxane) is synthesized by one of the following routes.

Different routes for the synthesis of poly 2 vinyl pyridine with polydimethyl siloxane:

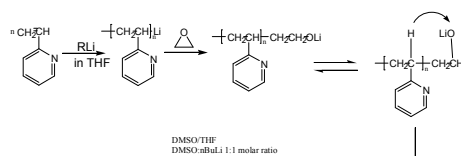
1. Direct Anionic Polymerization by sequential addition of 2VP followed by D3 monomer



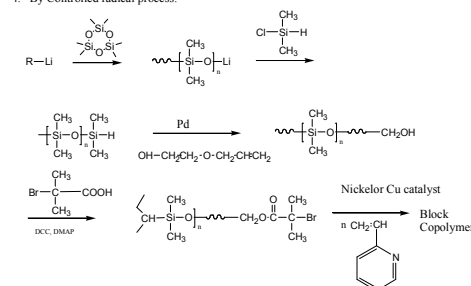
2. From the linking reaction of end functionalized polymer: For the synthesis of Block copolymer > Mn 10,000



3. Formation of first Poly 2vinyl pyridine OH terminated polymer than reacting the isolated P2VPOH polymer with n BuLi followed by addition of D3 in the presence of DMSO equimolar amount with nBuLi



4. By Controlled radical process:



## **Characterization:**

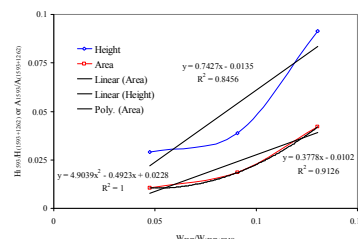
Polymers were analyzed by size exclusion chromatography (SEC) to obtain the molecular weight and polydispersity index (PDI). The block copolymer composition was then calculated from <sup>1</sup>H-NMR spectroscopy by comparing the peak area of the 2-vinyl pyridine proton at about 8.2 ppm with the dimethyl siloxane protons at 0.08 ppm. Copolymer PDI is determined by SEC.

## **Thermal analysis:**

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>). The melting temperature (T<sub>m</sub>) of the DMS was taken as the maximum of the endothermic peak in the thermogram.

FTIR: The Composition of the polymer were also checked by FTIR.

Relationship between weight fraction & FTIR peak area of 2VP in DMS



## **Solubility:**

Poly(2-vinyl pyridine-b-dimethyl siloxane) is soluble in THF, CHCl<sub>3</sub> and toluene.

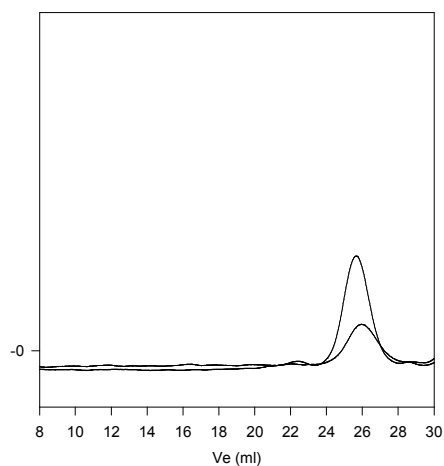
## **Thermal analysis results at a glance**

| Sample | T <sub>m</sub> (°C) | T <sub>c</sub> (°C) | T <sub>g</sub> (°C) |
|--------|---------------------|---------------------|---------------------|
| 2VP    | -                   | -                   | Not detected        |
| DMS    | -40                 | -                   | -62                 |

Contd. in next page

## SEC for the polymer:

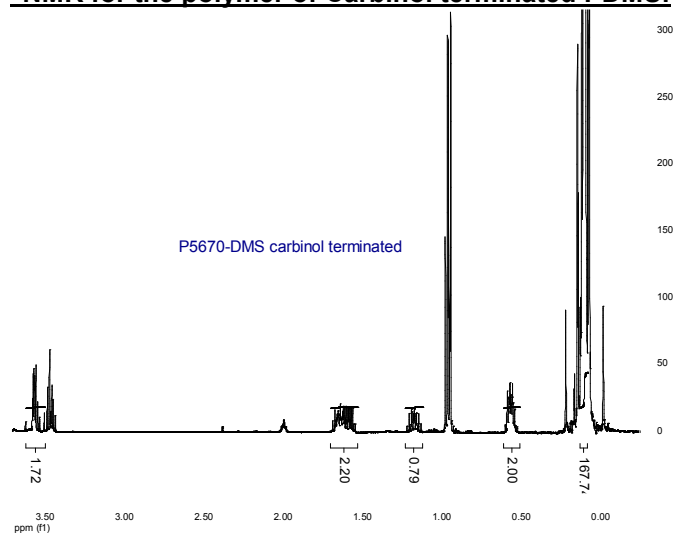
**P5670B-2VPDMS**



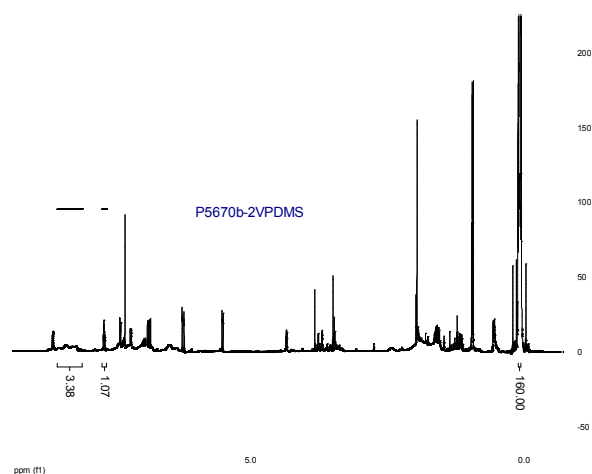
Size exclusion chromatography of

— Poly(DMS)Carbinol terminated,  $M_n \approx 2000$  Mw: 2240 Mw/Mn 1.14  
 — Block Copolymer P2VP(500)-b-PDMS(2000), PI= 1.18  
 Composition for  $^1\text{H}$  NMR

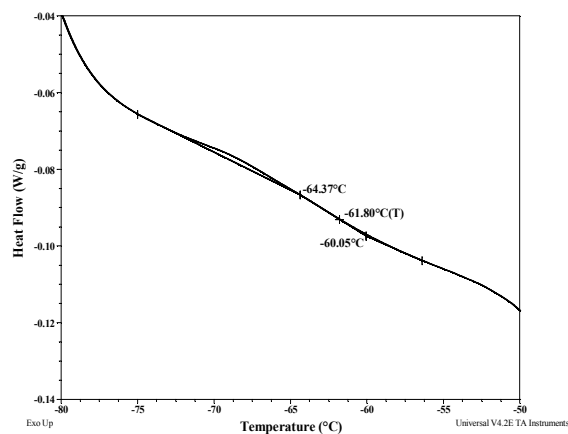
## $^1\text{H}$ NMR for the polymer of Carbinol terminated PDMS:



## $^1\text{H}$ NMR for the polymer of P2VP-DMS diblock copolymer:



## Thermogram for DMS block:



## Melting curve for DMS block:

