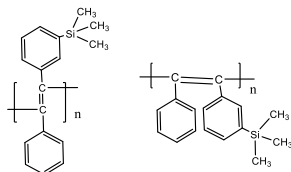


**Sample Name:** Poly(1-Phenyl-2-[m-(trimethylsilyl)phenyl] acetylene

**Other Name:** Poly(diphenyl acetylene) containing Trimethylsilyl moiety at meta position

**Sample #:** P44450-(m-Me3SiDPA)

**Structure:**

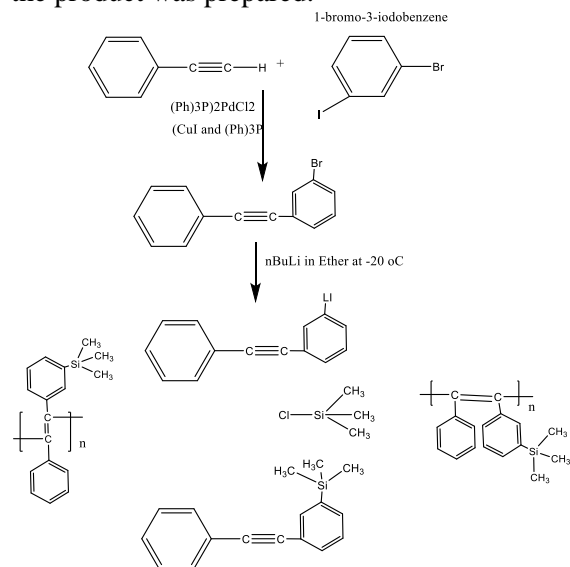


**Composition:**

Mw x 10 <sup>3</sup>	PDI
629.0 (In THF)	1.8
542.0 (in Toluene)	1.8
[-CPh=C(C6H4SiMe3)-]	

**Synthesis Procedure:**

The following reaction scheme shows how the product was prepared:



**Purification Of Monomer:**

Polymerization of monomer using TaCl5 catalyst and (Et)3 SiH co catalyst at 80 °C is dictated by its purity of monomer. The monomer purification requires multiple steps as follows:

1. Prepare a solution of crude monomer in Toluene 50% solution and stirrer over CaH2 over night at 80 °C. It was distilled under vacuum at oil bath temperature of 280 °C under vacuum of 0.2 mm of Hg.

2. The obtained solution is then treated with dibutyl Mg solution till to get light color solution. It was distilled under vacuum at oil bath temperature of 280 °C under vacuum of 0.2 mm of Hg.

3. The obtained solution is then treated with N BuLi solution (For 100g of monomer used 10 ml of 1.4 M solution) and solution stirrer for 30 minutes at room temperature. It was distilled under vacuum at oil bath temperature of 280 °C under vacuum of 0.2 mm of Hg. A clear solution is prepared and store in cold at 5 °C for further used.

**Polymerization:**

In a 2 L round bottom flask added freshly distilled Toluene= 500ml and added 8g of TaCl5 and light-yellow color develop. The solution was kept at 80 °C followed by addition of (Et)3SiH 5.5g and the solution stirrer for 30 minutes at 80 °C. A deep Ivory-garish color is formed. In another flask taken 50 g of Monomer solution in 50 g of Toluene. It was added to the catalyst solution at 80 °C. In Few second of addition of monomer solution a deep red color solution is form and the viscosity increase tremendously. The solution was kept at 80 °C for 1h. It was taken out from the bath and cooled down and precipitated in cold methanol. A light-yellow color fibrous soft polymer is formed. It was dried under vacuum at 40 °C. -Orange color Crude polymer obtained.

**Purification of the polymer:**

The crude polymer was redissolved in toluene. The resulting clear orange-yellow color solution was filtered using ordinary paper tissue paper (a thick solution in Toluene because of High molecular weight) and precipitate in methanol. precipitated in cold methanol, it forms light yellow color soft material, it was dried under vacuum at 45 °C temperature. -Orange color soft material obtained.

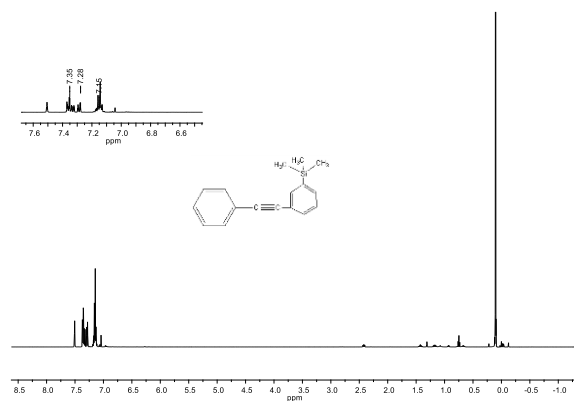
### Characterization:

The molecular weight and polydispersity index (PDI) are obtained by size exclusion chromatography (SEC) in THF or Chloroform. SEC analysis was performed on a Varian liquid chromatograph equipped with refractive and UV light scattering detectors. Three SEC columns from Supelco (G6000-4000-2000 HXL) were used with triple detectors from Agilent. The molecular weight is calculated based on polystyrene standards.

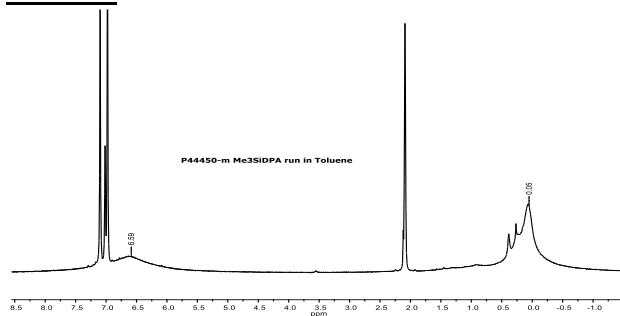
### Solubility:

Polymer is soluble in THF, Toluene and  $\text{CHCl}_3$ . Vary High Viscosity in these solvents. It is precipitated by methanol.

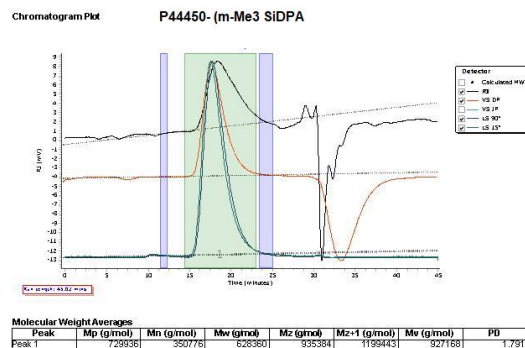
### H NMR spectrum of Monomer:



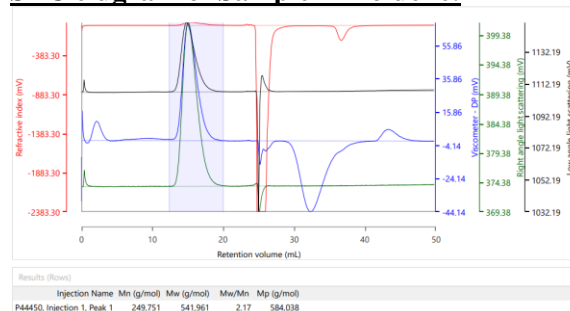
### HNMR spectrum of polymer run in Toluene:



### SEC elugram of Sample in THF:



### SEC elugram of Sample in Toluene:



Solution cast film from Toluene: It has good mechanical properties. The solution cast film generate light **Orange color Film flexible**

