

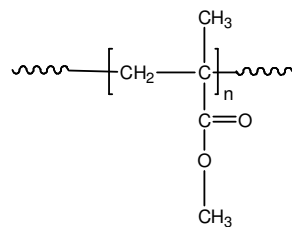
Sample Name: Poly(methyl methacrylate)

**Broad molecular weight distribution**

*Syndiotactic rich contents >79%*

Sample #: P4645-MMA

**Structure:**

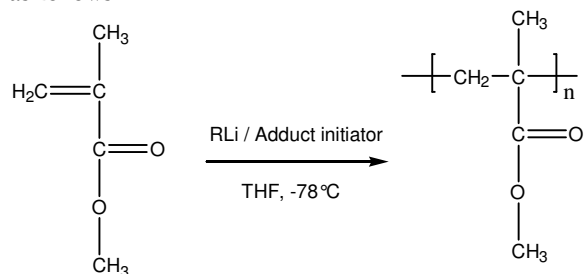


**Composition:**

Mn x 10 <sup>3</sup>	PDI
450.0	1.9

**Synthesis Procedure:**

Syndiotactic Poly(methyl methacrylate) is obtained by living anionic polymerization using sec.BuLi as initiator and capped with a unit of diphenyl ethylene or few units of  $\alpha$ -methylstyrene. The polymerization of MMA monomer is carried out in THF at  $-78^\circ\text{C}$  in the presence of LiCl as additive. For further details please see the following references.<sup>(1-4)</sup> The polymerization scheme can be illustrated as follows:



**Characterization:**

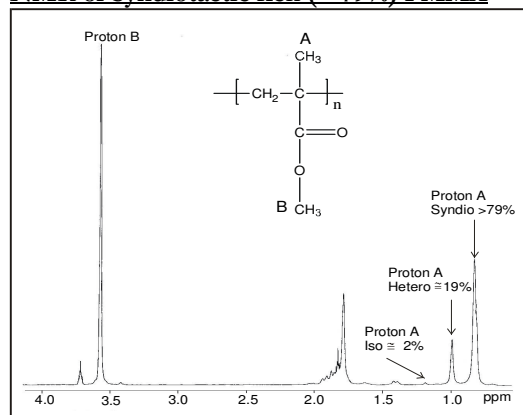
The molecular weight and polydispersity index (PDI) are obtained by size exclusion chromatography (SEC) in THF. SEC analysis was performed on a Varian liquid chromatograph equipped with refractive and UV light scattering detectors. Three SEC columns from Supelco (G6000-4000-2000 HXL) were used with triple detectors from Viscotek Co.  $^1\text{H}$  NMR analysis was carried out on Varian instrument at 500MHz.

Thermal analysis of the samples was carried out using a differential scanning calorimeter (TA Q100) at a heating rate of  $10^\circ\text{C}/\text{min}$ . The inflection glass transition temperature ( $T_g$ ) of the sample has been considered.

**Solubility:**

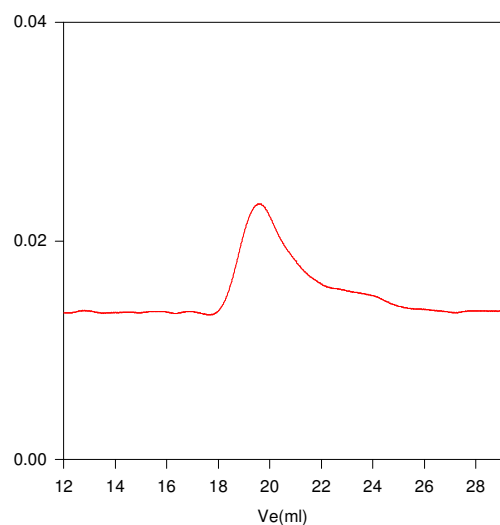
Poly(methyl methacrylate) is soluble in THF,  $\text{CHCl}_3$ , toluene and dioxane. The polymer precipitates from hexanes, methanol and ethanol.

NMR of Syndiotactic rich (> 79%) PMMA



SEC of Sample

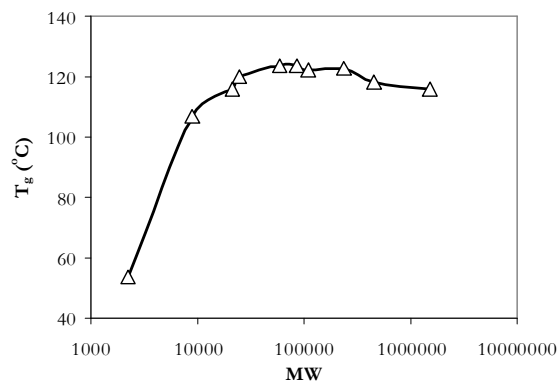
**P4645-MMA**



Size exclusion chromatography of poly(methyl methacrylate):

$M_n=450,000$ ,  $M_w=855,000$ ,  $M_w/M_n=1.9$

$T_g$  of MMA as function of molecular weight



**References for further information:**

- (a) S. K. Varshney, R. Fayt, Ph. Teyssie, US Patent 5,629,393, 1997  
(b) Ph. Bayard, R. Fayt, Ph. Teyssie and S. K. Varshney, Vuillemin B, Phillippe, H, US patent 5,677,387, 1997.(c) Ph. Bayard, R. Fayt, Ph. Teyssie and S. K. Varshney, B, Vuillemin, H. Phillippe, US patent 5,687,534, 1997.(d) S. K. Varshney, R. Fayt, Ph. Teyssie, US Patent 5,723,559, 1998. (e) Ph. Teyssie, S. K. Varshney, R. Jerome, R. Fayt US patent, 4,826,941., 1989.
- Ph. Teyssie, Ph. Bayard, R. Jerome, S. K. Varshney, and J. S. Wang, 35th IUPAC International Union of Pure & Applied Chemistry International Symposium on Macromolecules" 1994, 67.
- Ph. Teyssie, R. Fayt, J. P. Hautekeer, C. Jacobs, R. Jerome, L. Leemans and S. K. Varshney *Makromolekular Chemie, Macromol. Symp.*, 1990, 32,61-73.
- S. K. Varshney, J. P. Hautekeer, R. Fayt, R. Jerome, and Ph. Teyssie *Macromolecules*, 1990, 23, 2618-2622.

