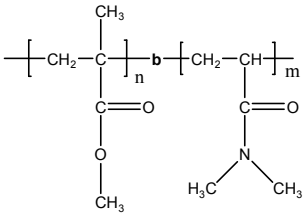
Sample Name: **Poly(methyl methacrylate -b- N,N-dimethyl acrylamide)**

Sample #: **P1718-MMADMA**

Structure:

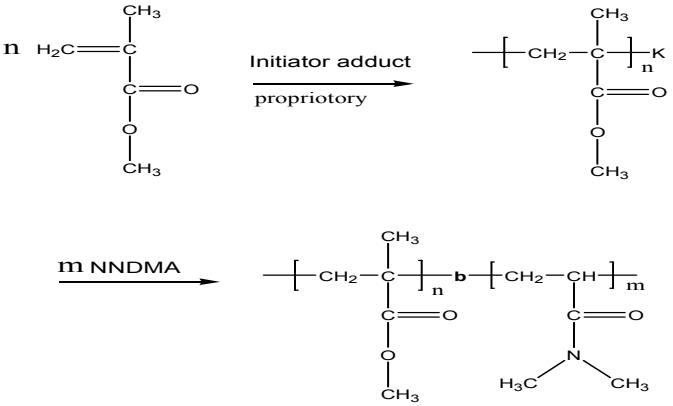


Composition:

Mn x 10^3 PMMA-b-PDMA	PDI
1.8-b-7.8	1.06
T_g (°C) for MMA: Not clear	T_g (°C) for DMA: 115

Synthesis Procedure:

Poly(methyl methacrylate -b- dimethyl acrylamide) is prepared by living anionic polymerization with sequence addition of methyl methacrylate followed by N,N-dimethyl acrylamide. The scheme of the reaction is illustrated below:



Characterization:

An aliquot of the anionic poly(methyl methacrylate) block was terminated before addition of N,N-dimethyl acrylamide and analyzed by size exclusion chromatography (SEC) to obtain the molecular weight and polydispersity index (PDI). The final block copolymer composition was calculated from ^{1}H-NMR spectroscopy by comparing the peak area of the methyl methacrylate protons at 3.6 ppm with the peak area of the dimethyl acrylamide (N-(CH3)2protons at 2.8-3.2 ppm. Copolymer PDI is determined by SEC in DMF as eluent at 40 °C.

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_g).

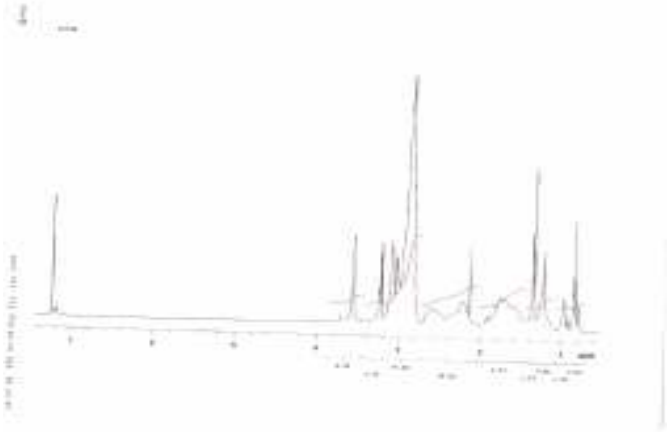
Purification of the Polymer:

The obtained polymer was precipitated in cold methanol or in Hexane/Ethanol cold depending on the compositions. The polymer was re-dissolved in $CHCl_3$ and wash with water. The polymer was dried in toluene/THF using rota-evaporator. The solution was precipitated in Hexane. The polymer dried at 40 °C under vacuum.

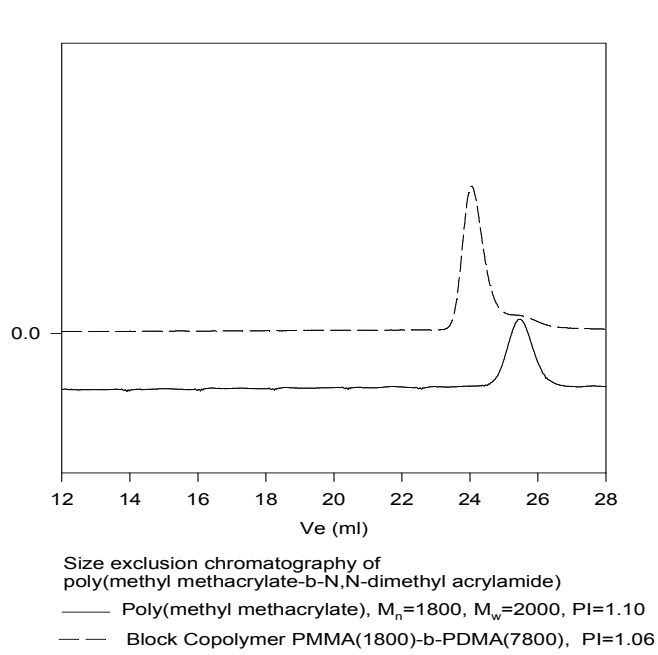
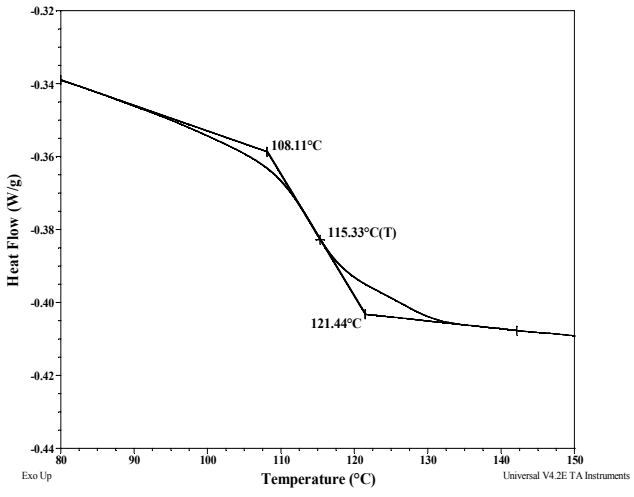
Solubility:

Poly(methyl methacrylate -b- N,N-dimethyl acrylamide) is soluble in $CHCl_3$, THF and in DMF.

^{1}H-NMR Spectrum of the block copolymer:



SEC of the block copolymer:



DSC thermogram for DMA block: