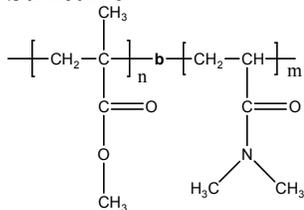


Sample Name: Poly(methyl methacrylate -b- N,N-dimethyl acrylamide)

Sample #: P4803-MMADMA

Structure:

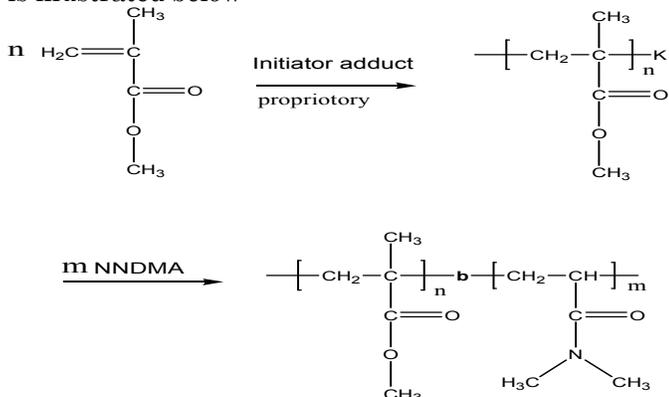


Composition:

| | |
|-------------------------------------|--------------------------------------|
| Mn x 10 ³ PMMA-b-PDMA | PDI |
| 85.5-10.0 | 1.6 |
| T _g for MMA: 120°C | T _g for DMA: Not distinct |

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 ¹H-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)₂) protons at 2.8-3.2 ppm. Copolymer PDI is determined by SEC in DMF as eluent at 40°C.

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 CHCl₃ 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.

Thermal analysis:

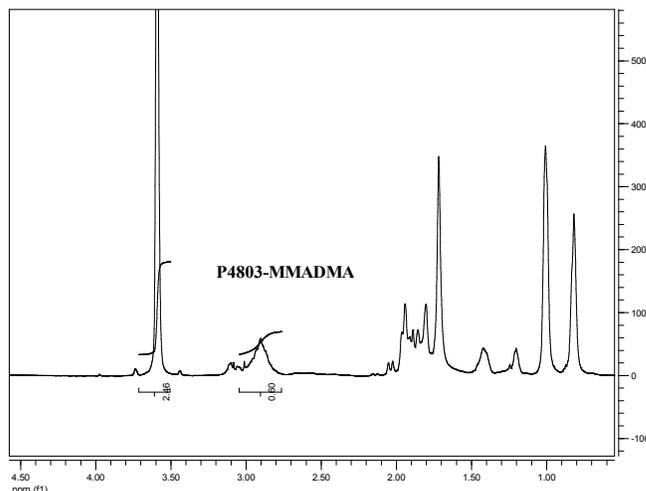
Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of 10°C/min. The midpoint of the slope change of the heat

flow plot of the second heating scan was considered as the glass transition temperature (T_g).

Solubility:

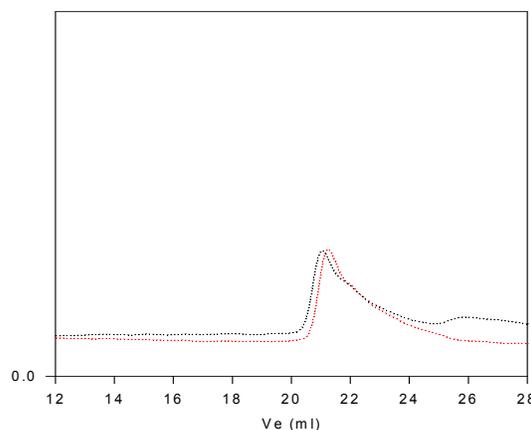
Poly(methyl methacrylate- b- N,N-dimethyl acrylamide) is soluble in CHCl₃, THF and in DMF.

¹H-NMR Spectrum of the block copolymer:



SEC of the block copolymer:

P4803-MMADMA



Size exclusion chromatography of poly(methyl methacrylate-b-N,N-dimethyl acrylamide): in DMF at 40 °C containing 0.01 M LiBr as additive
 ----- Poly(methyl methacrylate), M_n=85500, M_w=111000, PI=1.3
 ----- Block Copolymer PMMA(85500)-b-PNNDMA(10000), PI=1.6
 composition from H NMR

DSC thermogram for MMA block:

