

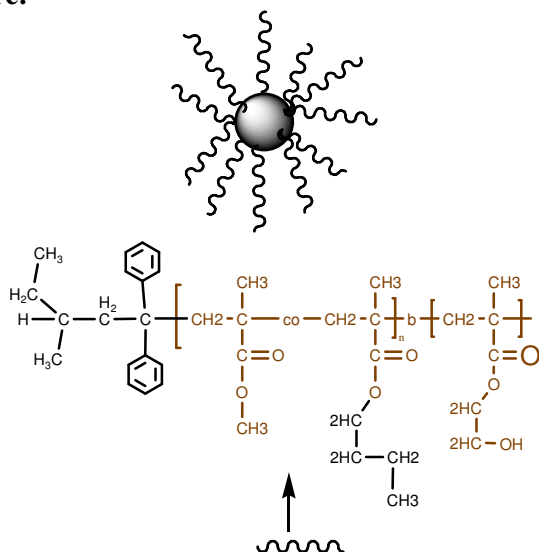
Sample Name:

Multi arms Poly(methyl methacrylate-*co*(*random*)-*n*-butyl methacrylate) -*block*-poly(2-hydroxyethyl methacrylate)

Using core of diethylene glycol dimethacrylate
of branches per core are about 36

Sample #: **P19774-MMAnBuMAran-b-HEMA-Star**

Structure:



Composition: # of Branches: ~ 36 per core

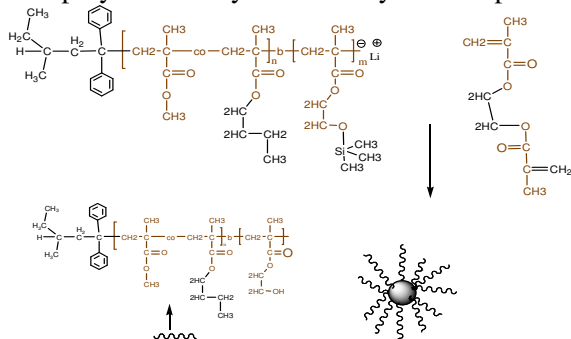
$M_n \times 10^{-3}$ (g/mol)	25.0- <i>b</i> -29.0
M_w/M_n	1.19
Star polymer 1,962.0	2.3

Molar ratio MMA : nBuMA	52 : 48 (mol/mol)
Wt ratio	60:40

T_g (MMAnBuMA)	77 °C
T_g (HEMA)	116 °C

Synthesis Procedure:

The polymer was synthesized by anionic process:



Solubility: The polymer is soluble in DMF.

Characterization:

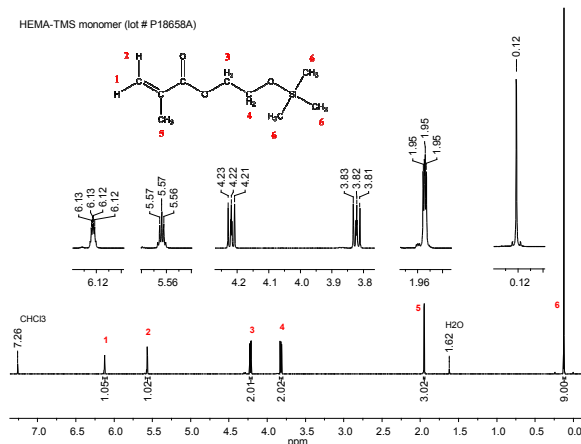
The polymer composition was determined by ^1H NMR. MMA:nBuMA molar ratio was calculated by comparing the integration of the $-\text{OCH}_2-$ protons of nBuMA (at $\delta = 3.9$ ppm) to the integration of methoxy group of MMA (at $\delta = 3.6$ ppm). Molecular weight of the second (HEMA) block was calculated by comparing the integration of $-\text{OCH}_2-$ protons of HEMATMS to the integration of methoxy group of MMA and using SEC data for the first (MMAnBuMA) block.

The average molecular weight and polydispersity index were determined by size exclusion chromatography (SEC). For SEC analysis, the MMAnBuMA-b-HEMA block copolymer can be treated with acetic anhydride in presence of pyridine to convert the hydroxy-groups to acetate groups.

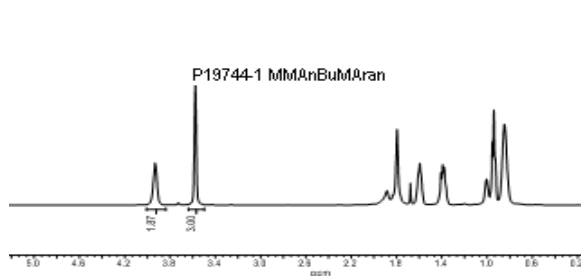
Thermal analysis of the sample was done on a TA Q100 differential scanning calorimeter (DSC) at a heating rate of $10^\circ\text{C}/\text{min}$. The glass transition temperature (T_g) was determined as a midpoint of step change in heat flow curve for the second heating scan.

^1H NMR spectrum of HEMATMS monomer (500

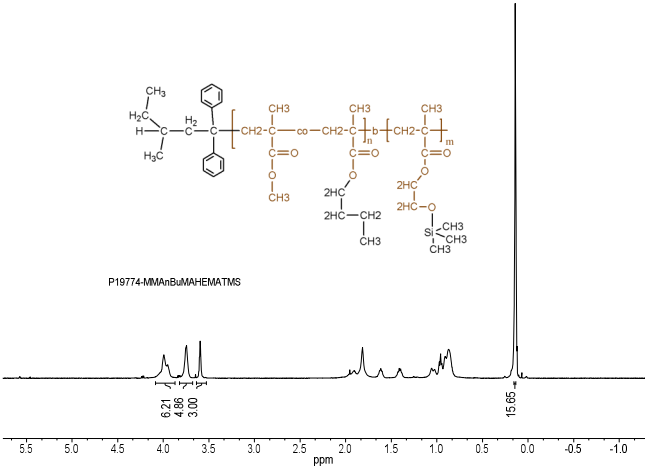
MHz, CDCl_3):



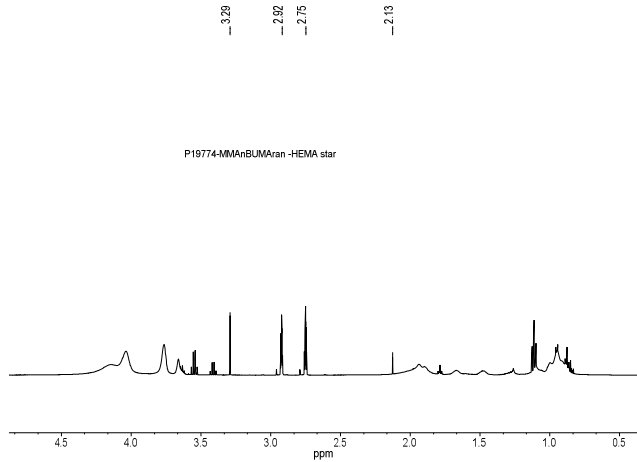
^1H NMR spectrum of MMAnBuMAran [first block]:



¹H NMR spectrum of MManBuMAran-b-HEMATMS:



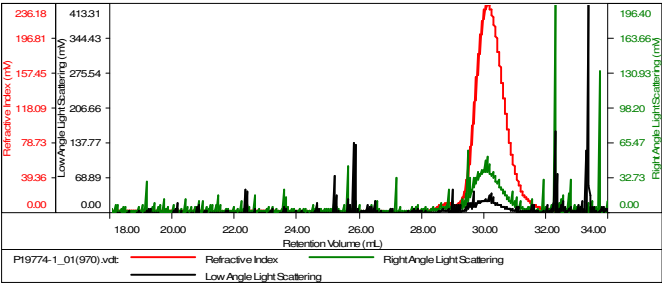
¹H NMR spectrum of MManBuMAran-b-HEMA-Multi arms in DMF:



SEC elugram of the first block:

Sample ID-P19774-1 MManBuMA ran

Concentration (mg/mL)	1.8094
Sample dn/dc (mL/g)	0.0940
Method File	PS80K-March2016-0001.vcm
Column Set	3x PL 1113-6300
Solvent	THF

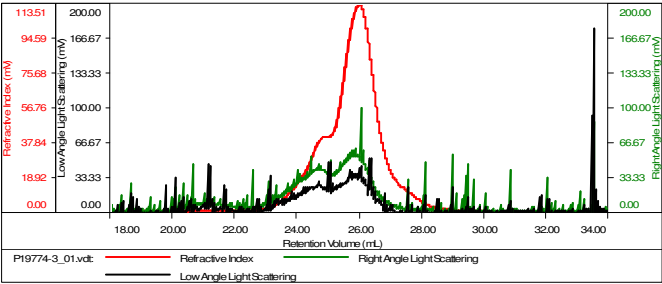


Sample	Mh (Da)	Mw (Da)	Mw/Mh	IV (dL/g)	Rh (nm)	Ret Vol (mL)
P19774-1_01(970).vcl	24,759	26,008	1.050	1.3475	10.64	30.090

SEC elugram of the polymer:

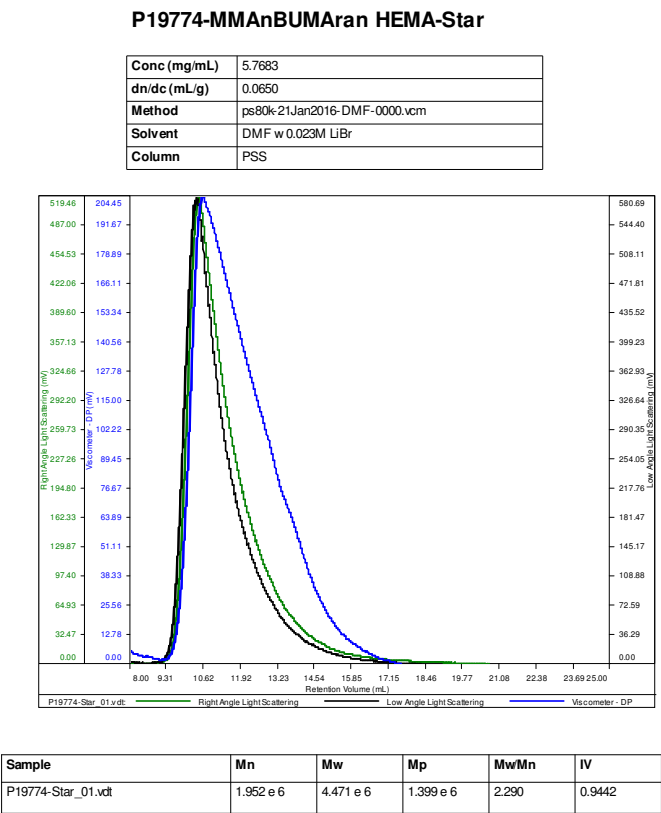
Sample ID-P19774-2-MManBuMA ran-HEMATMS

Concentration (mg/mL)	1.2255
Sample dn/dc (mL/g)	0.0940
Method File	PS80K-March2016-0001.vcm
Column Set	3x PL 1113-6300
Solvent	THF



Sample	Mh (Da)	Mw (Da)	Mw/Mh	IV (dL/g)	Rh (nm)	Ret Vol (mL)
P19774-3_01.vcl	70,130	84,007	1.198	1.9688	17.70	25.953

SEC elugram of the final product in DMF:



DSC thermogram of MMAAnBuMAran-b-HEMA:

