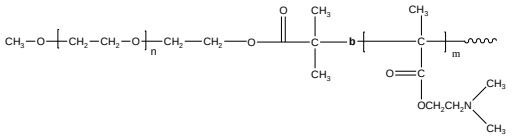
Sample Name:
Poly (ethylene oxide -b- 2-(dimethylamino) ethyl methacrylate)
Sample #: **P19333- EODMAEMA**

Structure:



Composition:

Mn x 10^3 PEO-b-PDMAEMA	PDI
11.0-b-7.5	1.2

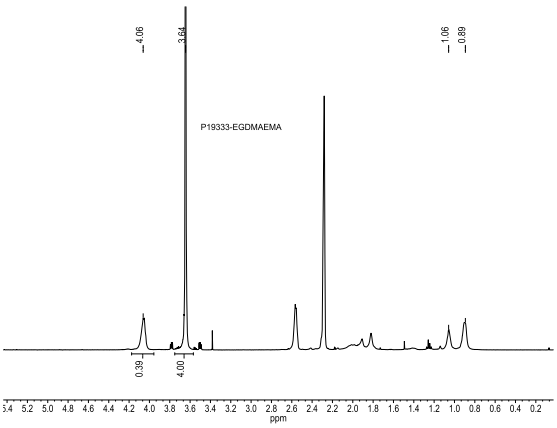
Synthesis Procedure:
Poly [ethylene oxide–b-2-(dimethylamino) ethyl methacrylate] is prepared by living anionic polymerization of ethylene oxide followed by control radical process for 2-(dimethyl amino) ethyl methacrylate polymerization.

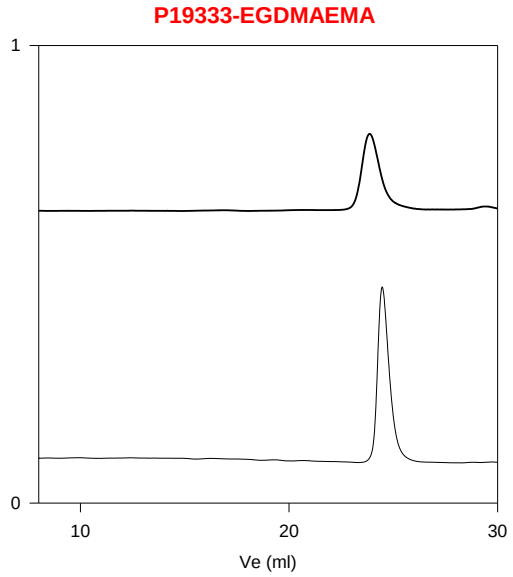
Characterization:
An aliquot of the first anionic block was analyzed by size exclusion chromatography (SEC) to obtain the molecular weight and poly dispersity index (PDI) before addition of the second block. The final block copolymer composition and molecular weight are calculated from ^{1}H-NMR spectroscopy by comparing the peak area of the ethylene oxide protons at about 3.6 ppm with the methylene in 2-(dimethylamino) ethyl methacrylate protons at about 4.28 ppm. No SEC signal of the diblock polymer was observed since there is strong interaction between the polymer and the column. However, different eluents and buffers have been tested.

Purification of the polymer and removal of any un-reacted homopolyethylene oxide from the diblock copolymer:
Polymer dissolved in water and the pH of the medium increased to about 13 by addition of NaOH. The polymer precipitated out by warming the solution at 80°C. The process was repeated twice to remove homo PEO completely. The obtained polymer dissolved in methanol and pH was adjusted to about 8 by adding HCL and filtered. The solvent was removed by rota-evaporator. The highly viscous solution was cold precipitated by hexane/ether mixture and finally dried under vacuum at 40°C.

Solubility:
The polymer is soluble in water.

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





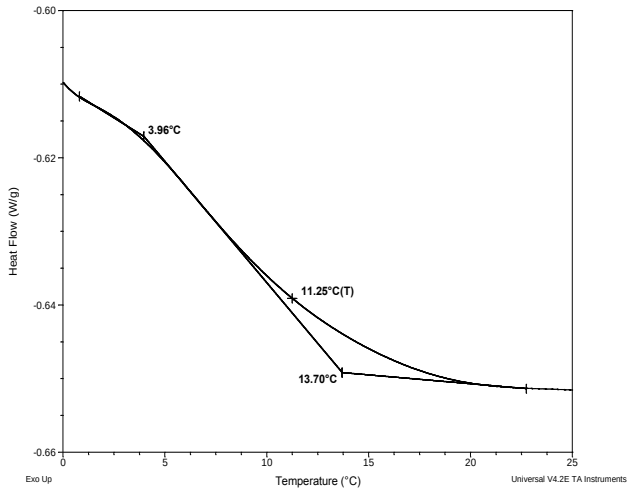
Size exclusion chromatography of the product:

Poly(ethylene glycol methyleher) : M_n=11,000, M_w=12,000, M_w/M_n=1.09
PEO-b-d15 DMAEMA: 11,000-b-7,500 Mw/Mn : 1.2

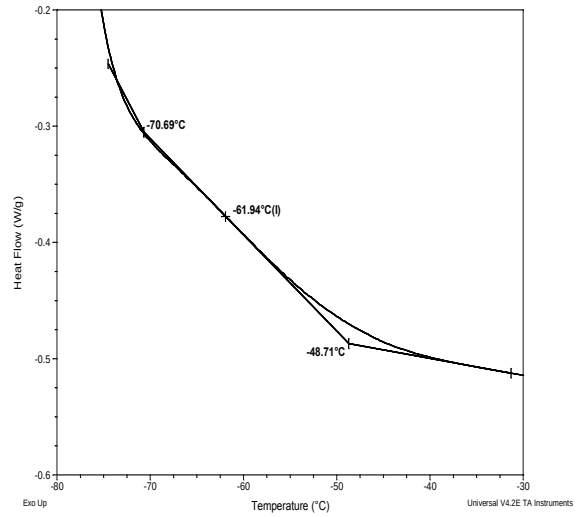
Thermal analysis of # P19333-EODMAEMA
Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of 15°C/min.The midpoint of the slope change of the heat flow plot of the second heating scan was considered as the glass transition temperature (T_g).

Thermograms for the sample

For DMAEMA block



For PEO block



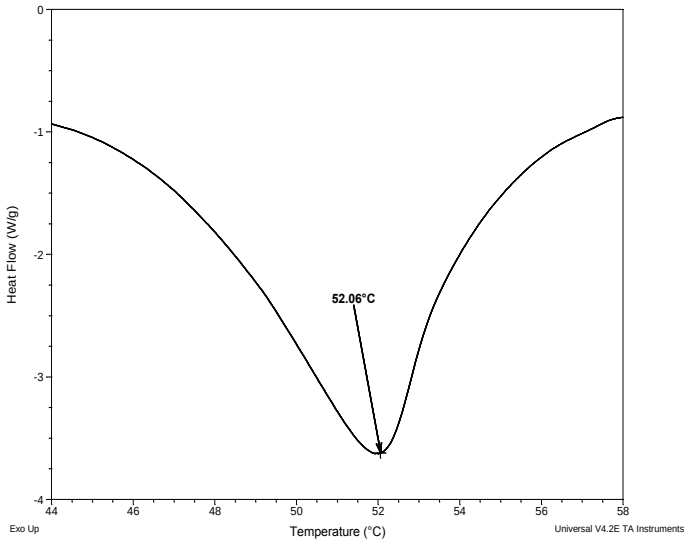
Thermal analysis results at a glance

For DMAEMA block		
T_g: 11°C	T_m: -	T_c: -
For PEO block		
T_g: -62°C	T_m: 52°C	T_c: 16°C

Melting and crystallization curve for the sample

The melting temperature (T_m) was taken as the maximum of the endothermic peak where as the crystallization temperature (T_c) was considered as the minimum of the exothermic peak. The T_c was calculated during **cooling ramp**.

Melting curve for PEO block



Crystallization curve for PEO block