

Polymer Sample # P18045-NIPAM
(S:H:Iso : 33:1:66)

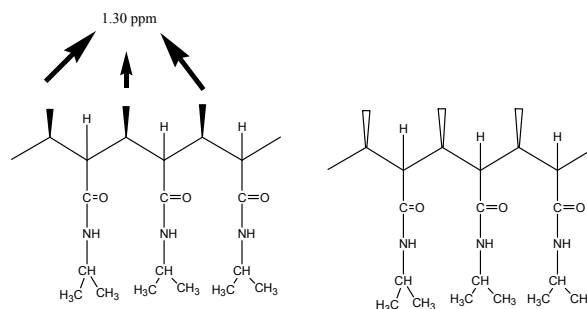
Sample Name:

Poly(N-isopropyl acrylamide) bearing different tacticity

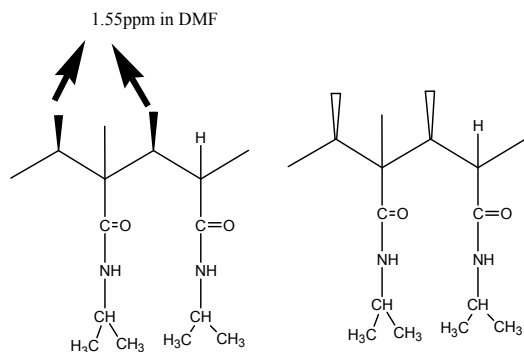
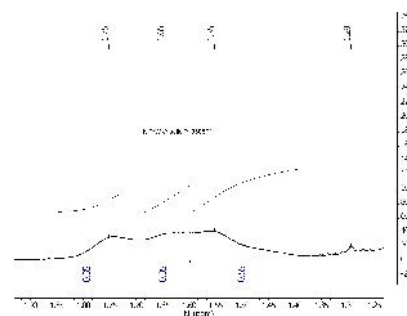
Polymer is synthesized by RAFT polymerization process using TMS protected NIPAM Monomer. Polymerization carried out in different solvents in the presence of ligands such as LiCl, diethyl Zinc, tri isobutyl aluminium and diethyl aluminum.

HNMR was carried out in DMF. Following are the chemical shifts for different microstructures.

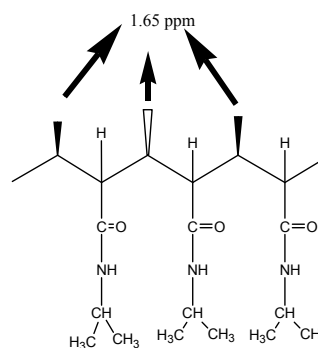
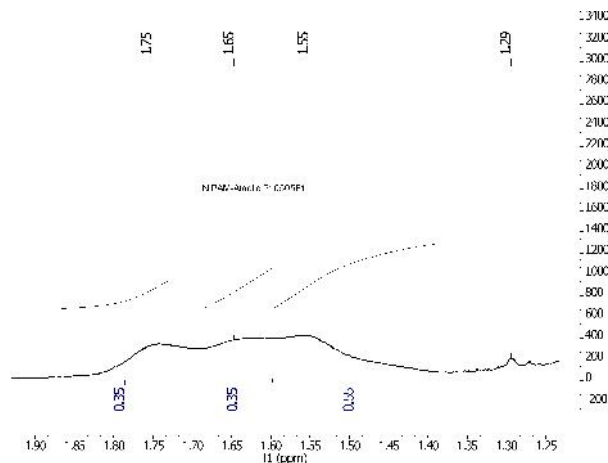
Solubility of Polymer: Solubility of poly NIPAM in water or in methanol dependent on the fraction of triad (mmm) iso contents presence in the polymer.



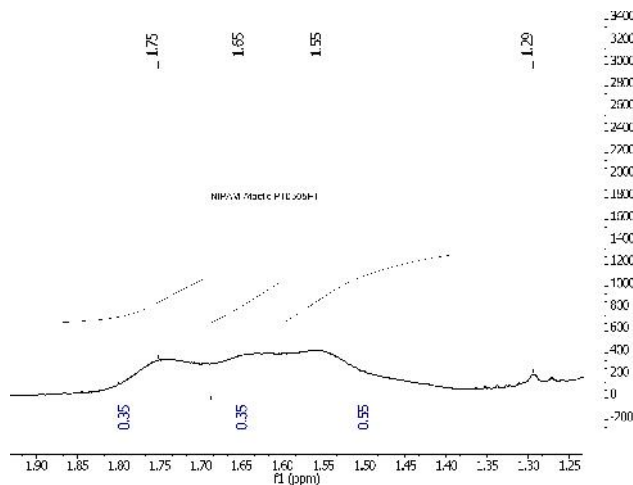
An example of meso triads



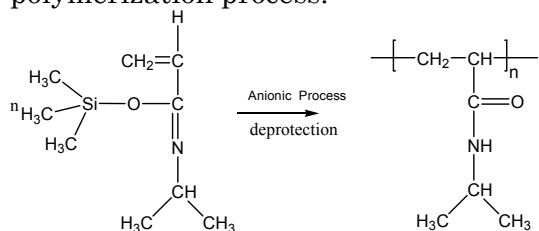
An example of meso diads



An example of Syndio (rrr) triads



Poly(N-isopropyl acrylamide) is obtained by NH protected NIPAM monomer using ionic polymerization process.



Characterization:

The molecular weight of poly(N-isopropyl acrylamide) are obtained by ^1H NMR carried out at 50 oC.

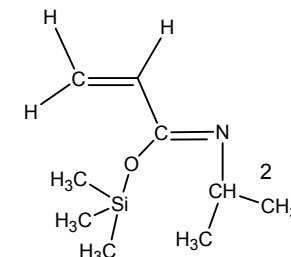
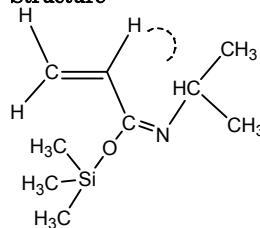
^1H NMR Of the monomer:

Sample Name:

N-isopropylacrylamide-TMS

Sample #: NIPAM-TMS (Lot# 14603)

Structure:



Major component
2-isomeric species

Minor Component

Composition:

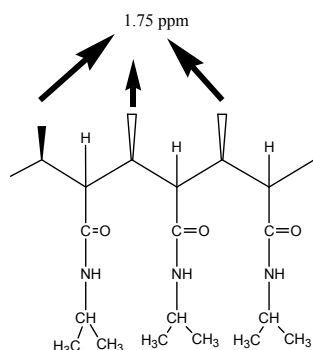
Mass	PDI
185	1
Purity	>98%

$\text{C}_9\text{H}_{19}\text{NOSi}$

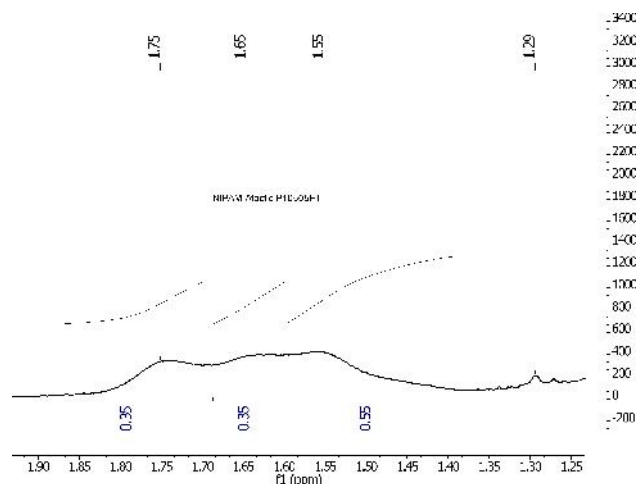
Mol. Wt.: 185.3

C, 58.32; H, 10.33; N, 7.56; O, 8.63; Si, 15.15

^1H -NMR Spectrum monomer:



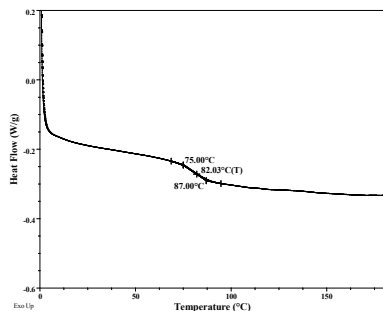
An example of hetero (rmmr) triads



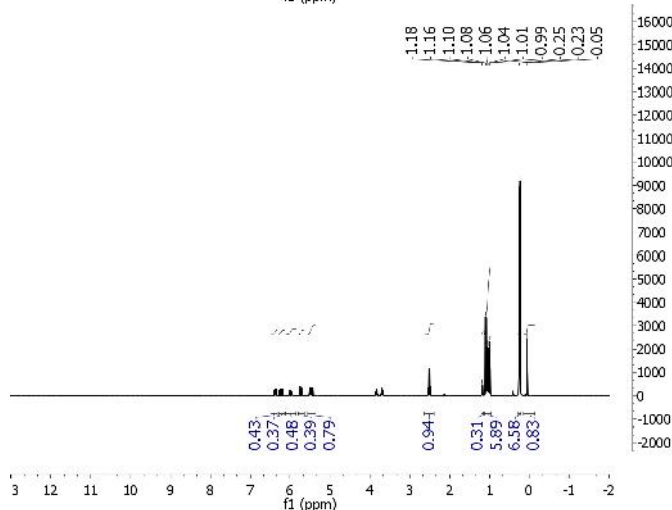
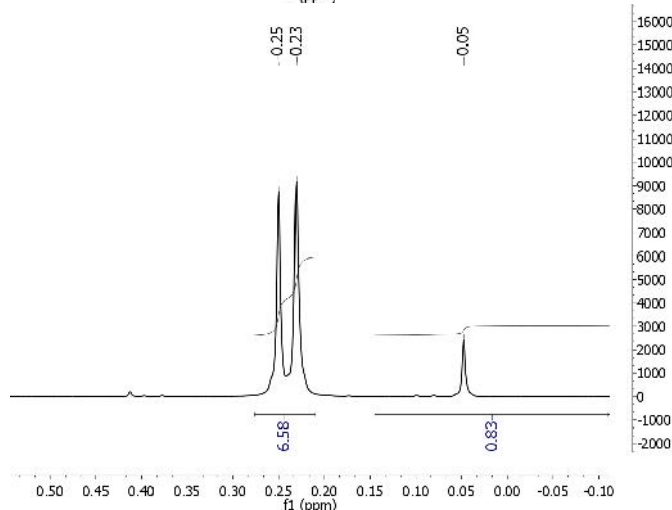
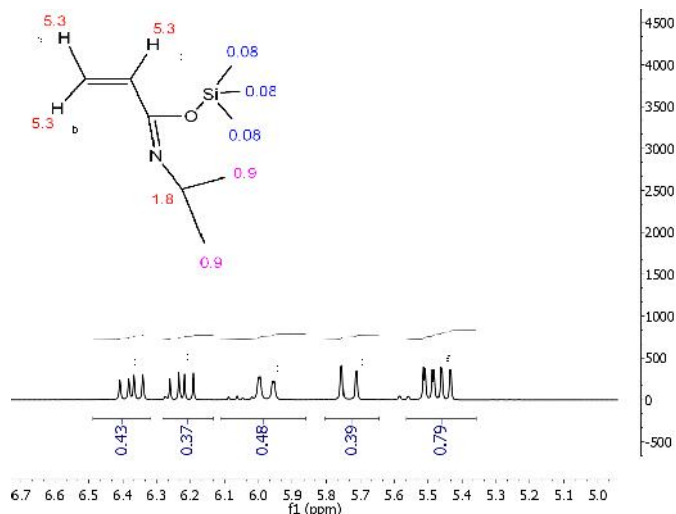
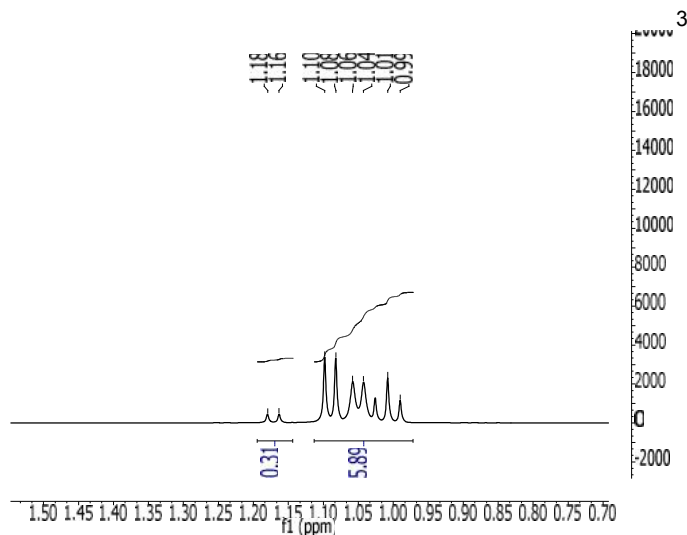
Molecular composition:

Mn x 10 ³	Mw x 10 ³	(mmm) triad contents %	Solubility in different Solvents				
			Water	Toluene	CH ₃ OH	CHCl ₃	DMF
8.5	25.0	39	No	No	Cloudy	NO	Yes

Tg of polymer: 82 oC mid point



Synthesis Procedure:

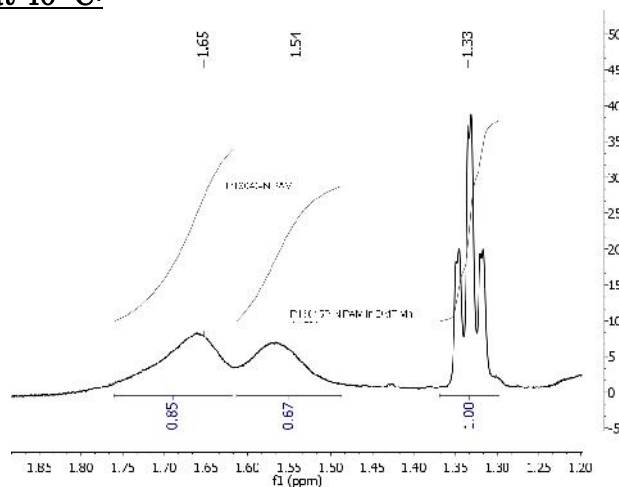


¹H NMR of the TMS-NIPAM in $CDCl_3$ consist 2 sets of signals due to two isomers in the ratio of 1:0.8 ratio. Thus in the polymerization of TMS_NIPAM in toluene, one of the isomers exists predominately over the other.

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).

¹H NMR of the Polymer carried out in DMF at 40 °C:



DSC thermogram for the polymer:

