

Sample # : P18068-NIPAM

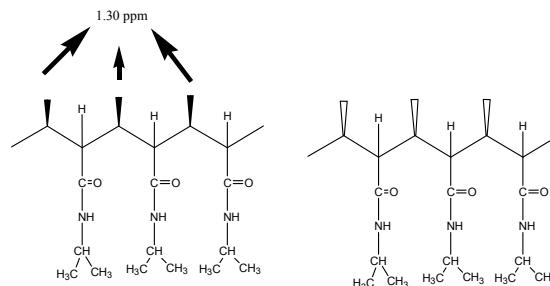
**Poly(N-isopropyl acrylamide) bearing different tacticity**

Polymer is synthesized by anionic 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.

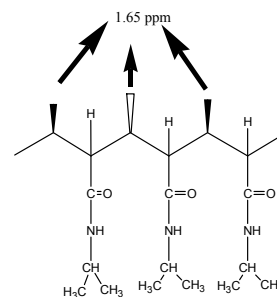
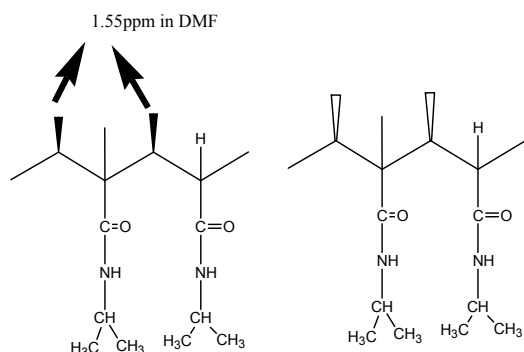
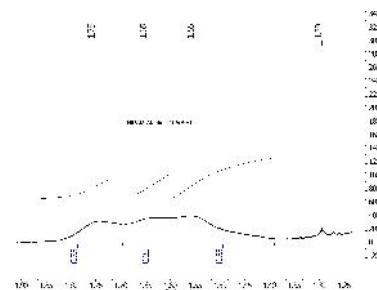
HNMR was carried out in DMF.

Following are the chemical shifts for different microstructures.

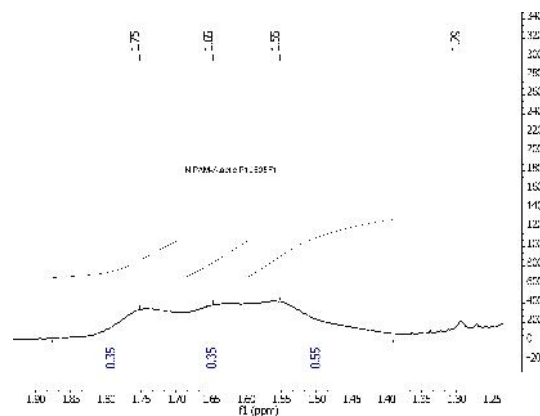
**Solubility of Polymer:** Solubility of poly NIPAM in water or in methanol dependent on the fraction of triad (mmm) iso contents presence in the polymer.



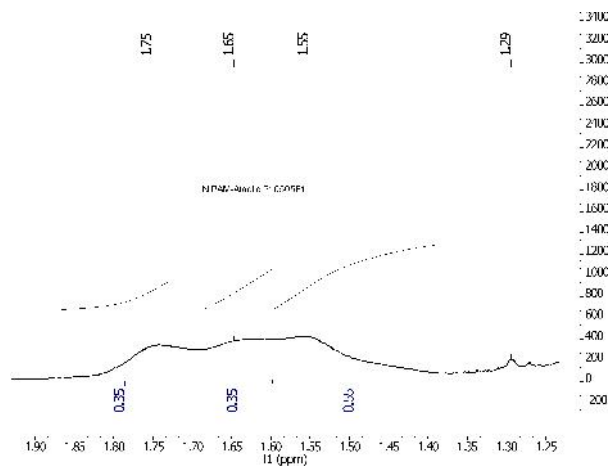
An example of meso triads

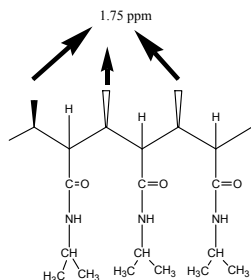


An example of Syndio (rrr) triads

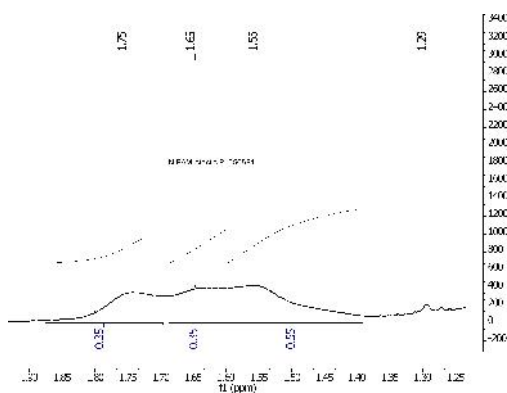


An example of meso diads





An example of hetero (rmmr) triads

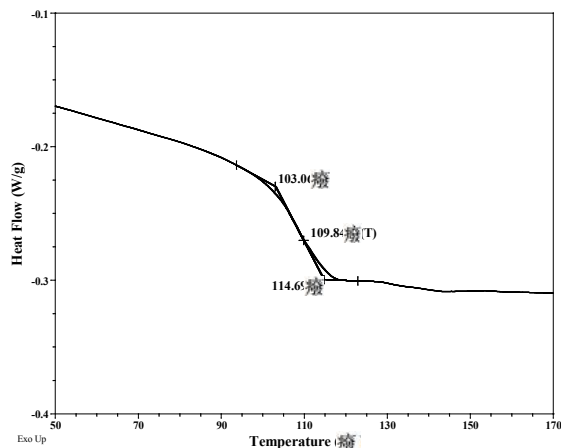


**Polymer Sample # P18068-NIPAM**  
(S:H:Iso : 99:1:0)

**Molecular composition:**

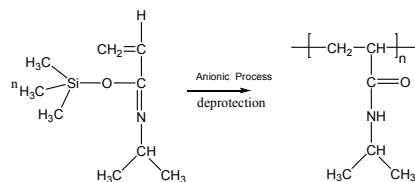
Mn x 10 <sup>3</sup>	Mw x 10 <sup>3</sup>	(mmm) triad contents %	Solubility in different Solvents				
			Water	Toluene	CH <sub>3</sub> OH	CHCl <sub>3</sub>	DMF
2.0	10.5	0	No	No	NO	NO	yes

**Tg of polymer: 109 oC mid point**



### Synthesis Procedure:

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 <sup>1</sup>H NMR carried out at 50 oC.

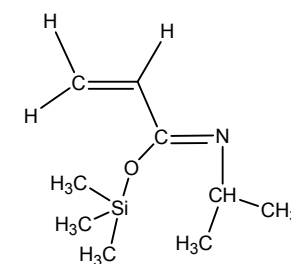
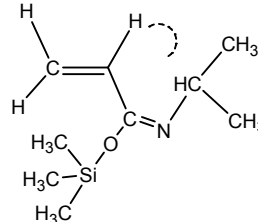
### <sup>1</sup>H-NMR Of the monomer:

Sample Name:

*N-isopropylacrylamide-TMS*

Sample #: **NIPAM-TMS (Lot# 14603)**

Structure:



Major component  
2-isomeric species

Minor Component

**Composition:**

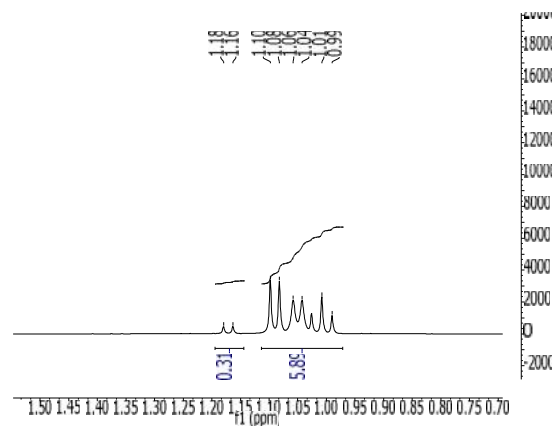
Mass	PDI
185	1
Purity	>98%

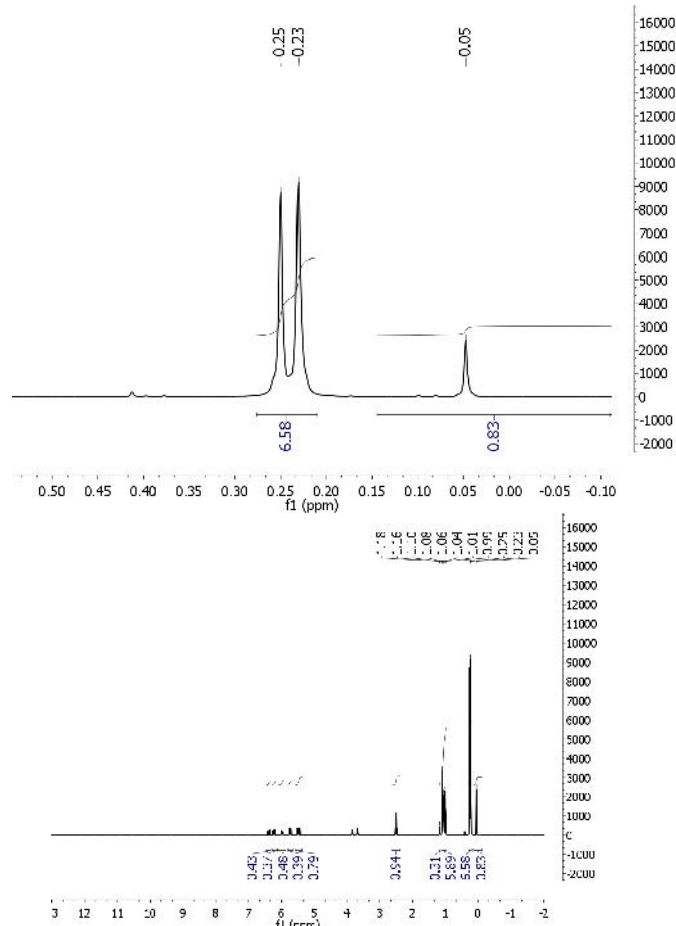
**C<sub>9</sub>H<sub>19</sub>NOSi**

Mol. Wt.: 185.3

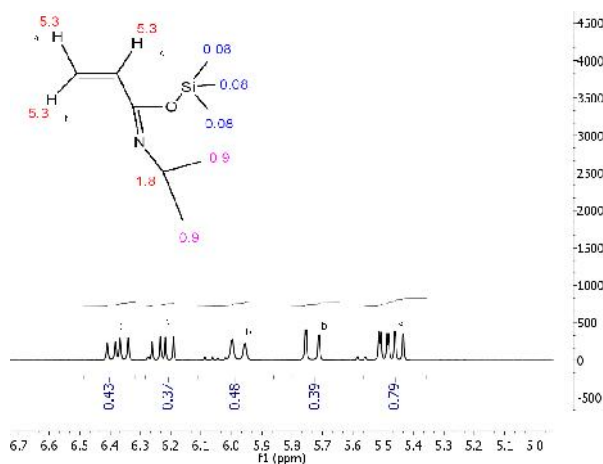
C, 58.32; H, 10.33; N, 7.56; O, 8.63; Si, 15.15

### <sup>1</sup>H-NMR Spectrum monomer:





<sup>1</sup>H NMR of the TMS-NIPAM in  $\text{CDCl}_3$  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  $10^\circ\text{C}/\text{min}$ .

The midpoint of the slope change of the heat flow plot of the second heating scan was considered as the glass transition temperature ( $T_g$ ).

### GPC of the Polymer

#### <sup>1</sup>H NMR of the Polymer carried out in DMF at $40^\circ\text{C}$ :

