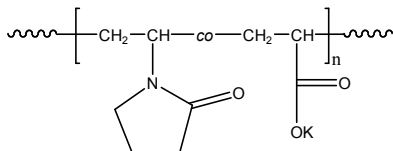**Sample Name:** **Poly(N-vinylpyrrolidone -co- acrylic acid)**

Sample #: **P14461-VPAAran**

Structure:

Composition:

Comments Column: AA mol%

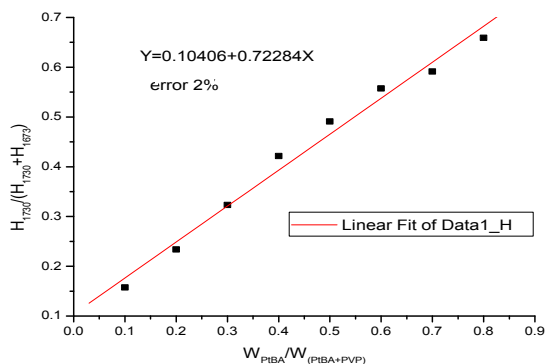| Mn x 10³ P(VP-co-AA)	PDI	Comments (mole%)
70.0	1.12	69.0
Tg for the random polymer	230°C	

Synthesis Procedure:

Poly(N-vinylpyrrolidone -co- Acrylic acid) is prepared by RAFT polymerization with N-vinylpyrrolidinone and t-butyl acrylate followed by hydrolysis of the t-butyl group.

Characterization:

Poly(N-vinylpyrrolidone -co- t-butyl acrylate) was analyzed by size exclusion chromatography (SEC) to obtain the molecular weight, polydispersity index (PDI) of the composition. The random copolymer composition was calculated from FTIR and NMR. The Mn of Poly(N-vinylpyrrolidone -co- potassium acrylate) was calculated from Poly(N-vinylpyrrolidone -co- t-butyl acrylate)

Note: The calculation of the composition bases on the FTIR standard fit line obtained from polymers that have known composition.

FTIR standard line for composition calculation:
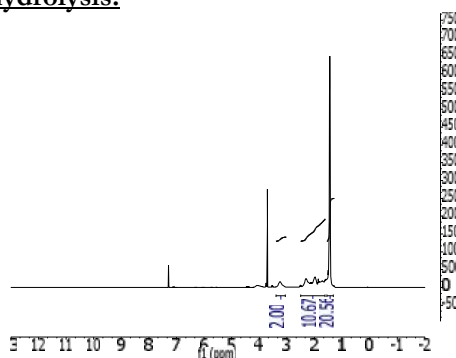

$Y=0.10406+0.72284X$

error 2%

Thermal analysis:

Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of 20°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 (Tg).
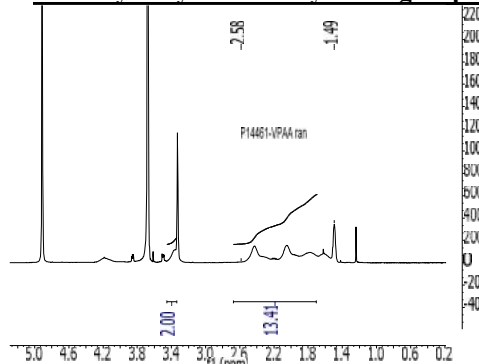
Solubility:

Poly(N-vinylpyrrolidone -co- acrylic acid) is soluble in methanol, ethanol, THF, water, DMF, toluene. It precipitated from hexane and ether, then dialyzed and freezing dried.
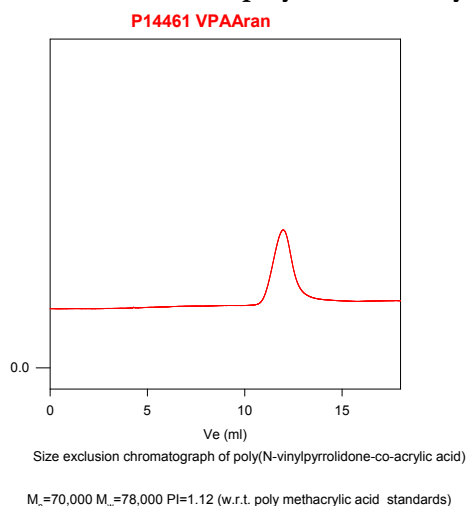
¹H-NMR Spectrum of the random copolymer before hydrolysis:

After hydrolysis of t-butyl ester group : Hydrolysis: 85%

P14461-VPAA ran

SEC of the block copolymer before hydrolysis:

P14461 VPAAran

Ve (ml)

Size exclusion chromatograph of poly(N-vinylpyrrolidone-co-acrylic acid)

M_n=70,000 M_w=78,000 PI=1.12 (w.r.t. poly methacrylic acid standards)

DSC thermogram for the sample: