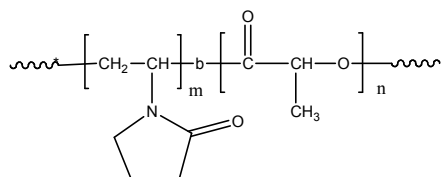


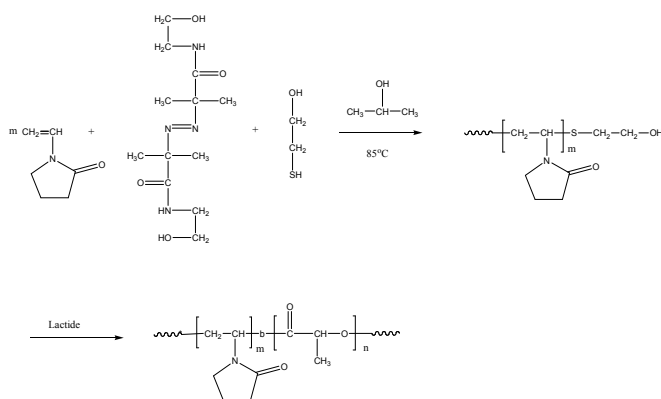
Poly(N-vinylpyrrolidone -b- lactide) (DL form)

Structure:



Mn x 10 ³ PVP-b-PLA	PDI
2.2-b-3.5	1.6

Poly(N-vinylpyrrolidone -b- lactide) is prepared by radical polymerization of N-vinylpyrrolidinone at the presence of chain transfer agent, followed by anionic polymerization of lactide with the catalyst. The scheme of the reaction is illustrated below:



An aliquot of the hydroxyl ended poly(N-vinylpyrrolidone) block was terminated before addition of lactide and analyzed by size exclusion chromatography (SEC) to obtain the molecular weight and polydispersity index (PDI). The final block copolymer composition was calculated from ^1H -NMR spectroscopy by comparing the peak area of the methane of lactide at about 5.1 ppm with the poly(N-vinylpyrrolidone) protons at about 1.0-4.5 ppm deducted the methyl contribution of lactide.

Poly(N-vinylpyrrolidone -b- lactide) is soluble in chloroform, THF, DMF, toluene and precipitates from ethanol, ether and hexane.

1H NMR spectrum of P4889-NVPOH in CDCl₃. The x-axis is chemical shift in ppm (delta) from 0 to 4. The spectrum shows several peaks: a multiplet at ~3.6 ppm (integration 1.87), a multiplet at ~2.5 ppm (integration 1.40), a complex multiplet between 1.5-2.2 ppm (integration 3.46), and a sharp singlet at ~1.0 ppm (integration 6.00). Above the spectrum, the chemical structure of P4889-NVPOH is shown with proton labels: 1-9 for the main chain and 10-12 for the vinyl group. The integration values are written below the baseline.

Hydroxyl ended poly(N-vinylpyrrolidone),
M_n=2200, M_w=3500, PI=1.6. (M_n obtained by NMR)

Poly(N-vinylpyrrolidone)-b-Poly lactide,
M_n=2200-b-3500 PI=1.6. (compositions obtained by NMR)

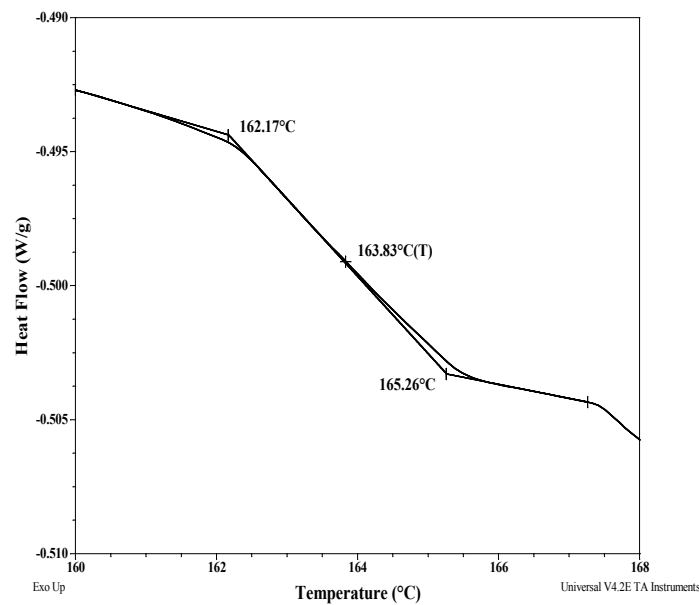
Thermal analysis of the sample# P4898-NVPLA

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).

Thermal analysis results at a glance:

NV block	PLA block (DL form)
$T_g = 164^{\circ}\text{C}$	$T_g = 25^{\circ}\text{C}$

Thermogram for the NV block



Thermogram for the PLA block:

