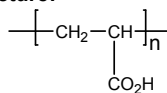


Sample Name:  
**Poly(acrylic acid)**  
Sample #: **P4458-AA**

**Structure:**

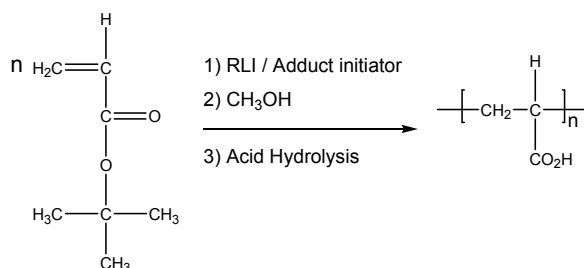


**Composition:**

$M_n \times 10^3$	PDI
61.5	1.20

**Synthesis Procedure:**

Poly(acrylic acid) is synthesized by anionic polymerization of t-butyl acrylate followed by hydrolysis of the tert. butyl group. The reaction scheme is below.



**Characterization:**

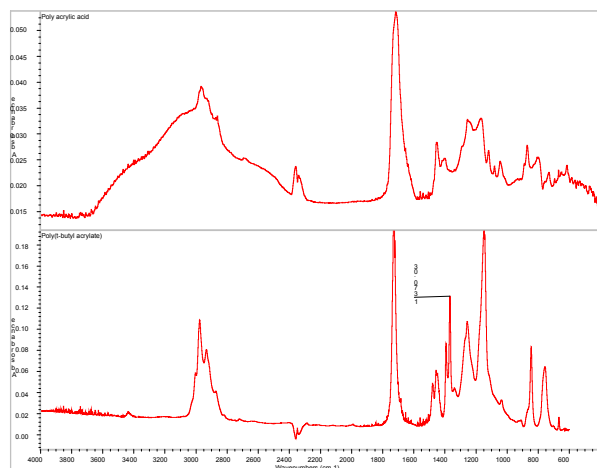
The molecular weight and polydispersity index (PDI) are obtained by size exclusion chromatography (SEC) in THF. SEC analysis was performed on a Varian liquid chromatograph equipped with refractive and UV light scattering detectors. Three SEC columns from Supelco (G6000-4000-2000 HXL) were used with triple detectors from Viscotek Co.

**Hydrolysis:** The quantitative hydrolysis of the ester is confirmed by the disappearance of tert.butyl ester absorbance at around 1370cm<sup>-1</sup>.

**Solubility:**

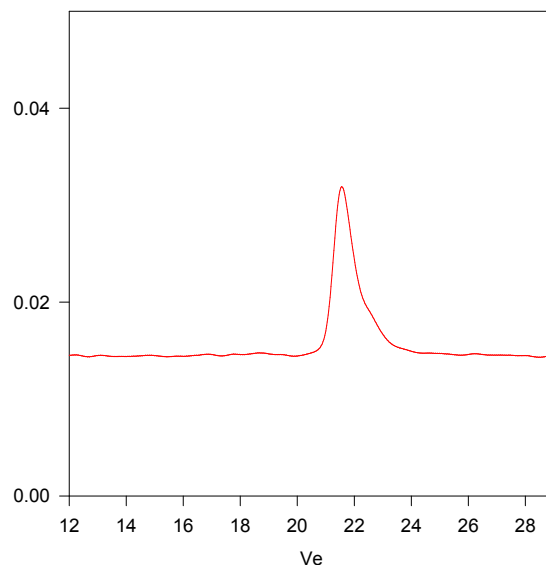
Poly(acrylic acid) is soluble in THF, water, methanol, ethanol. The polymer precipitates from ether, acetone, hexane.

**FTIR Spectra of Poly tert. butyl acrylate and poly acrylic acid**



**SEC of Homopolymer:**

**P4458-tBuA Precursor for P4458-AA**



Size Exclusion Chromatography of Poly tert-butyl acrylate:

$M_n=109000$ ,  $M_w=131000$ ,  $PI=1.2$  after hydrolysis of tert.butyl ester

Polyacrylic acid:  $M_n=61500$ ,  $M_w/M_n=1.20$

**References:**

1. Ph. Teyssie, Ph. Bayard, R. Jerome, **S. K. Varshney**, and J. S. Wang, *35th IUPAC International Union of Pure & Applied Chemistry International Symposium on Macromolecules* 1994, 67.
2. R. Fayt, R. Forte, C. Jacobs, R. Jerome, T. Ouhadi, Ph. Teyssie and **S. K. Varshney**, *Macromolecules*, 1987, 20, 1442-1444.
3. Jerome, R. Forte, **S. K. Varshney**, R. Fayt, and Ph. Teyssie, "The Anionic Polymerization of Alkylacrylates: A Challenge" in the Recent Advances in Mechanistic and Synthetic Aspects of Polymerization: M. Fontanille and A. Guyot Ed., NATO ASI Series C 215, 101 (1987), CA Vol. 108, 12, 094992.
4. Ph. Teyssie, R. Fayt, C. Jacobs, R. Jerome, L. Leemans, and **S. K. Varshney** *Am. Chem. Soc., Polym. Prepr.* 1988, 28, 2, 52-53