Sample Name:
α-Carboxy ω-Hydroxy Terminated Poly(ethylene glycol)

Sample #: **P2418-EGCOOH**

Structure:

H—[O–CH$_2$–CH$_2$]—O—(CH$_2$)$_x$—C(=O)—OH

or

H—[O–CH$_2$–CH$_2$]—C(=O)—(CH$_2$)$_y$—C(=O)—OH
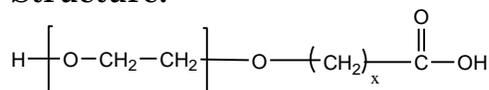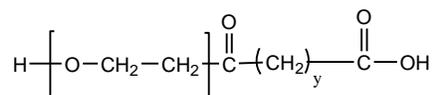
x = 3, 4, 11   y = 2, 3

Composition:

Mn x 10^3	PDI
2.7	1.16

Synthesis Procedure:
α-Carboxy ω-Hydroxy terminated poly(ethylene glycol) was synthesized by a simple procedure discovered in our lab. The details can be found in the US patent.[1]

Characterization:
The molecular weight and polydispersity index of this polymer were determined by size exclusion chromatography (SEC) using a Varian liquid chromatograph equipped with a UV and refractive index detector.

Functionality:
Functionality of the polymer was determined by acid base titration and from H NMR analysis.

Solubility:
Polymer is soluble in water, methanol and ethanol, THF, CHCl$_3$. It is precipitated out from cold ethanol, isopropanol, hexane and ether.

SEC of Sample:

P2418- PEG-COOH
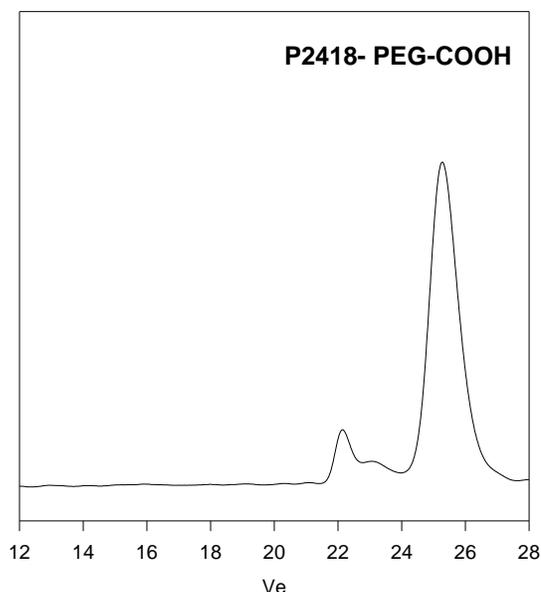
Size Exclusion Chromatography profile of the product:
M$_n$= 2700 (SEC w.r.t PEG calibration) Mw/Mn 1.16
Mn: by titration (3800)

Reference:
S. K. Varshney, J.X. Zhang, US patent 7,009,033 B2, 2006 Assigned to Polymer source, Inc. Canada Heterofunctional Polyethylene glycol and Poly ethylene oxide, process for their Manufacture

Thermal analysis of the P2418-EGCOOH

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).

Melting and crystallization curve for the sample

The melting temperature (T_m) was taken as the maximum of the endothermic peak where as the crystallization temperature (T_c) was considered as the minimum of the exothermic peak.

Thermal analysis results at a glance

Sample	T_m (°C)	T_c (°C)	T_g (°C)
EGOCH3NH2	51	32	-31

Thermogram for the PEO block
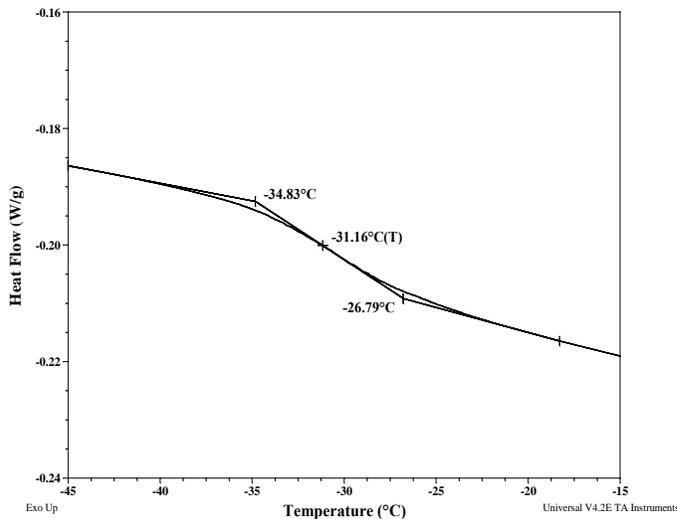
Melting curve for the polymer:

Crystallization curve for the polymer: