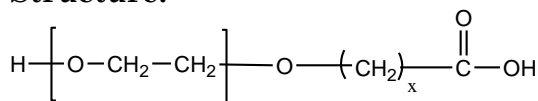


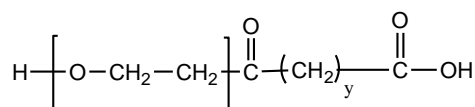
Sample Name:  
 **$\alpha$ -Carboxy  $\omega$ -Hydroxy Terminated  
 Poly(ethylene glycol)**

Sample #: **P8663A-EGCOOH**

**Structure:**



or



$x = 3, 4, 11$        $y = 2, 3$

**Composition:**

$M_n \times 10^3$	PDI
1.8	1.17

**Synthesis Procedure:**

$\alpha$ -Carboxy  $\omega$ -Hydroxy terminated poly(ethylene glycol) was synthesized by a simple procedure discovered in our lab. The details can be found in the US patent.<sup>1</sup>

**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:**

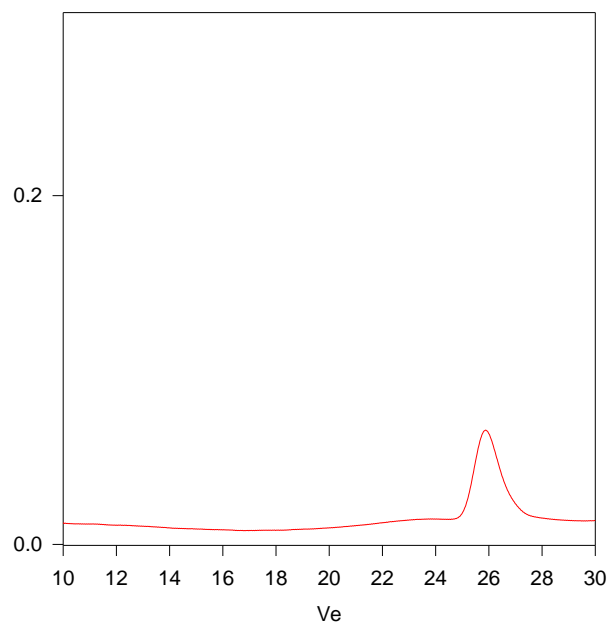
Functionality of the polymer was determined by acid base titration and from H NMR analysis.

**Solubility:**

Polymer is soluble in water, methanol and ethanol, THF,  $\text{CHCl}_3$ . It is precipitated out from cold ethanol, isopropanol, hexane and ether.

**SEC of Sample:**

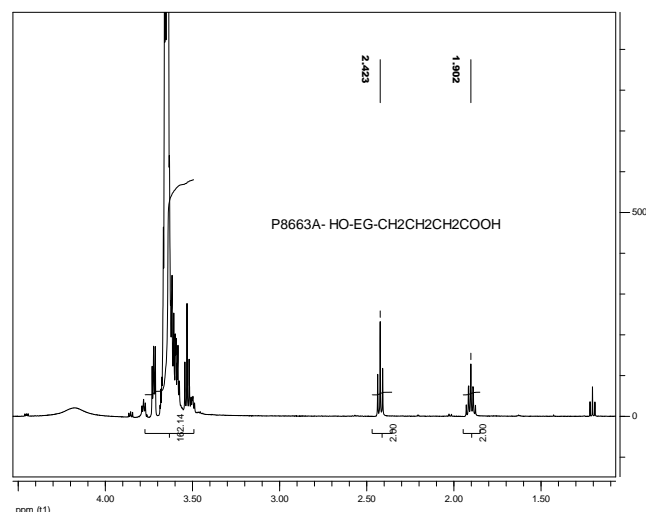
**P8663- EGOHCOOH**



Size Exclusion Chromatography profile of the product:

$M_n = 1800$ ,  $M_w = 2100$ ,  $PI = 1.17$

The COOH end group was converted to an ester to avoid the adsorption with the column packing materials.



**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 P8663A-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 ( $T_g$ ).

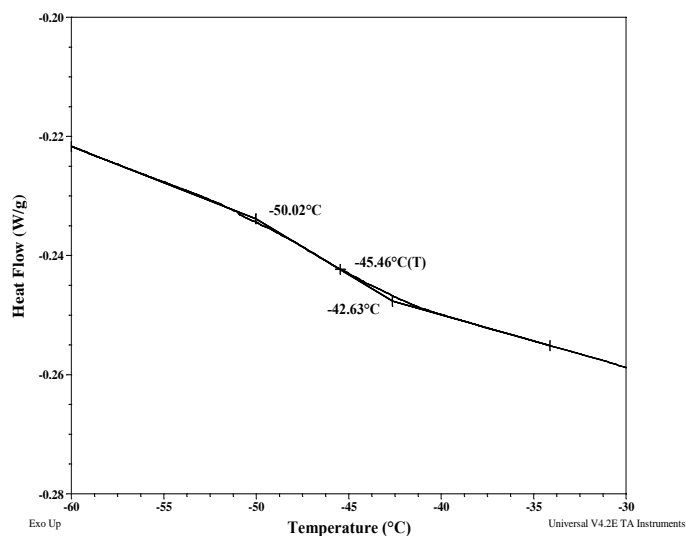
### Melting and crystallization curve for the sample

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.

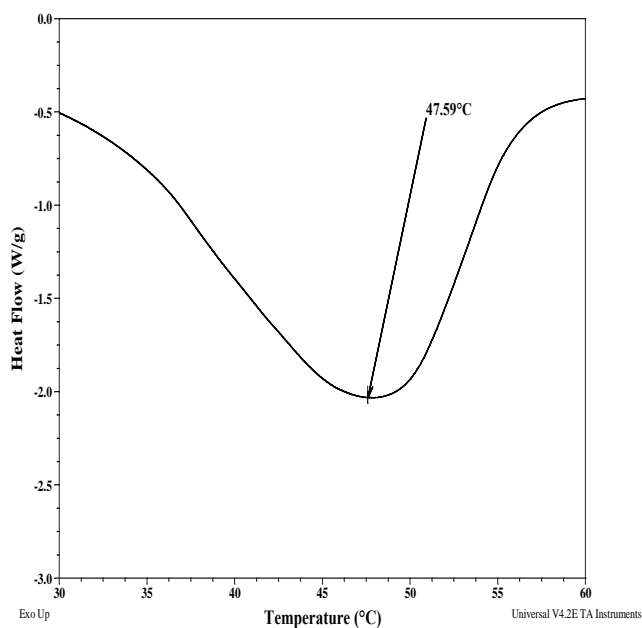
### Thermal analysis results at a glance

Sample	$T_m$ (°C)	$T_c$ (°C)	$T_g$ (°C)
EGOCH <sub>3</sub> NH <sub>2</sub>	48	22	-45

### DSC thermogram for the polymer:



### Melting curve for the polymer:



### Crystallization curve for the polymer:

