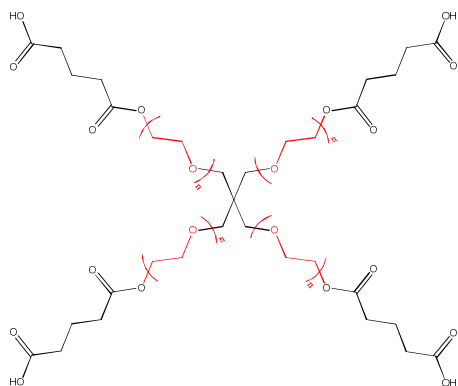


**Sample Name:****Carboxy-terminated four-arm poly(ethylene oxide)****Sample # P2272-4EOCOOH****Structure:****Composition:**

Total $M_n \times 10^3$	$M_w/M_n$	-COOH functionality
6.9	1.11	> 99%

**Synthesis procedure:**

The polymer was prepared by anionic living polymerization of ethylene oxide using pentaerythritol potassium salt as the initiator.

**Purification of the polymer:**

Purification of the obtained polymer was carried out rigorously as follows to ensure the removal of the catalyst side product:

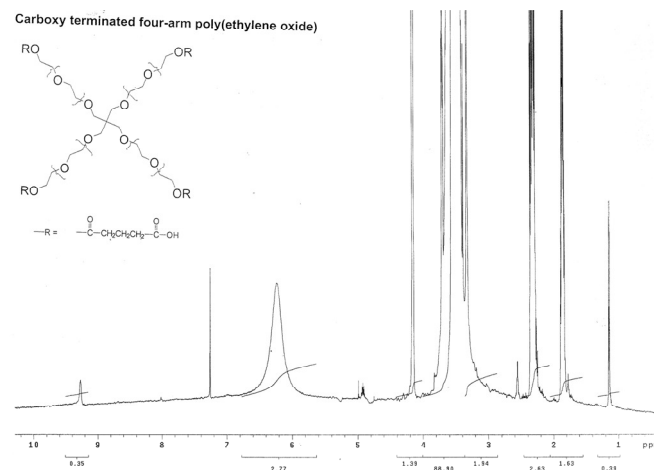
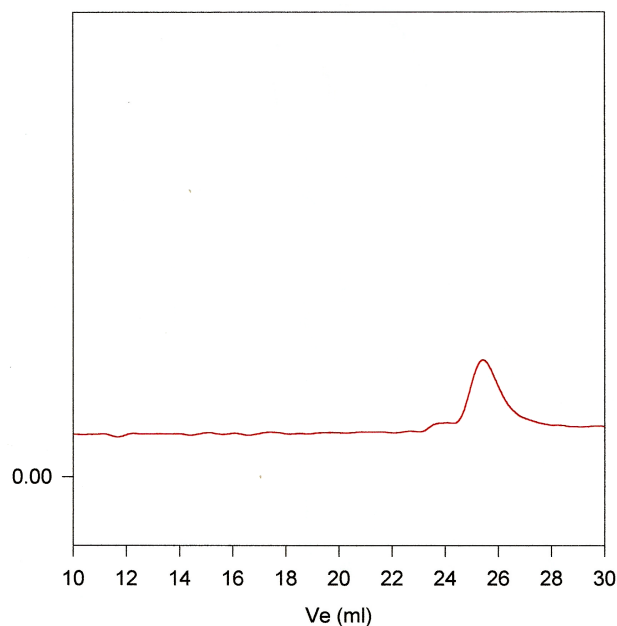
1. The polymer was dissolved in de-ionized distilled water to remove the any insoluble organic catalyst side product.
2. The polymer was extracted from water with DCM.
3. The polymer solution in dichloromethane was dried over anhydrous sodium sulfate.
4. The solution was filtered and then passed through a column packed with basic  $Al_2O_3$ .
5. The solution was concentrated on a rotavap.
6. The solution was precipitated into cold diethyl ether.
7. The product was dried under reduced pressure for 48h at  $38^\circ C$ .

**Characterization:**

The polymer was characterized by  $^1H$  NMR, size exclusion chromatography (SEC), and FTIR. SEC analysis was performed using Varian liquid chromatograph equipped with UV and refractive detector. SEC columns (from Supelco) were calibrated with poly(ethylene oxide) standards. THF containing 2vol%  $Et_3N$  was used as an eluent.

**Functionality:**

The end group functionalization with carboxy (-COOH) group was calculated by titration.

 **$^1H$  NMR spectrum of the polymer in  $CDCl_3$ :****SEC elugram:****P2272-4EO-COOH**

Size Exclusion Chromatogram of Four-Arm Poly(ethylene glycol)

 $M_n=6900$ ,  $M_w=7660$   $M_w/M_n=1.11$ **FT-IR spectrum:**