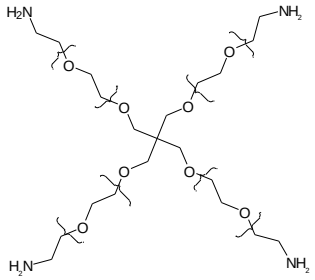
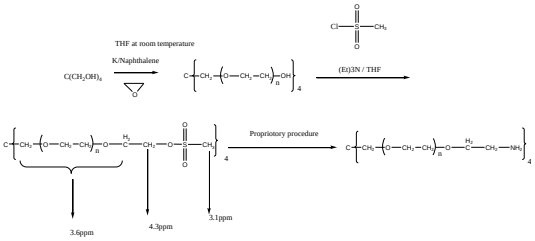
Sample Name:
Four arm Amino terminated Poly ethylene oxide

Sample #: P8600-4EONH2



Mn x 10^3 (total)	PDI	NH2 Functionality
41.0	1.09	100%

Synthesis Procedure:
The polymer was prepared by anionic living polymerization of ethylene oxide using pentaerythritol potasium salt as the initiator. The scheme of the reaction is illustrated below:

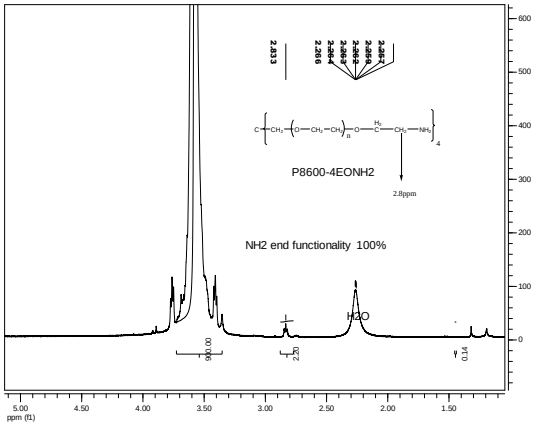


Characterization.
By Size exclusion chromatography (SEC): Varian liquid chromatograph equipped with UV and refractive detector. SEC columns from Supelco were used with THF containing 2 vol% $(Et)_3N$ as the eluent. The molecular weights were determined using light scattering detector and viscosity detector. The molecular weights and the polydispersity indice were calculated.
An aqueous GPC column from Supelco(G5000 PWXL) was also used with 0.5 M acetic acid and 0.8 M NaNO3 as the eluent. It was kept at a constant temperature of 50°C. The flow rate was 1.0 ml/min. The column was calibrated with monodisperse poly(ethylene oxide) standards. The molecular weights and the polydispersity index of polyethylene oxide were calculated by using a Visual Basic GPC software.

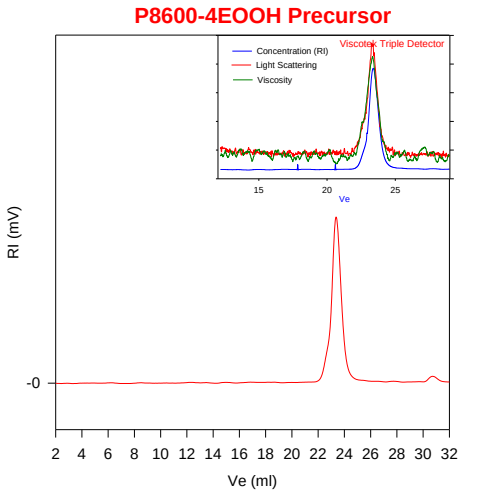
Purification of the obtained polymer:
Purification of the obtained polymer was carried out rigorously as follows to ensure the removal of the catalyst side product:

1. Dissolved the polymer in de-ionized distilled water to remove the any insoluble organic catalyst side product.
2. Polymer extracted from water with dichloromethane.
3. Polymer solution in dichloromethane was dried over anhydrous sodium sulfate.
4. Solution filtered and than passed through a column packed with basic Al_2O_3 .
5. Solution concentrated on rota-evaporator
6. Solution precipitated in cold diethyl ether.
7. Dried under vacuum for 48h at 38 oC.

Solubility:
Polymer is soluble in THF, water and $CHCl_3$. The polymer is insoluble in hexane, ether, cold isopropanol and cold ethanol.
Functionality: The amino functionality was titrated by $HClO_4$ using violet crystal as indicator.
HNMR of four arm PEG-NH2



SEC of the product



Size Exclusion Chromatography of four-arm Poly(ethylene oxide)

M_n = 41,000, M_w = 44,700, M_w/M_n = 1.09
Light Scattering data: dn/dc in THF at 35°C: 0.067ml/g
Solution Viscosity in THF at 35°C; 0.51dl/g
Radius of Gyration: Rg= 9.25 nm