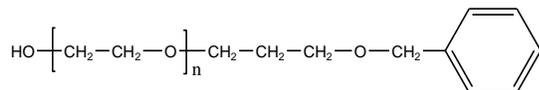


Sample Name:

Poly (ethylene glycol) mono-benzyl ether

Sample #: P6789-EGBenzyl

Structure:



Composition:

$M_n \times 10^3$	PDI
5.0	1.08

Synthesis Procedure:

Poly (ethylene glycol) is obtained by living anionic polymerization.

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% $(\text{Et})_3\text{N}$ as the eluent. The molecular weights were determined using light scattering detector and viscosity detector. The molecular weights and the polydispersity indices were calculated.

An aqueous GPC column from Supelco (G5000 PWXL) was also used with 0.5 M acetic acid and 0.8 M NaNO_3 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 GPC software.

Purification of the obtained polymer:

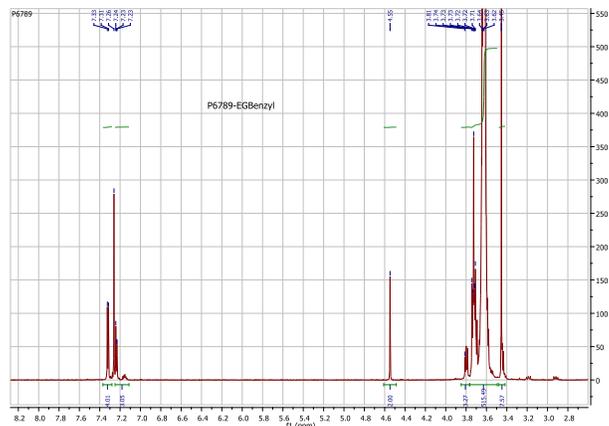
Purification of the obtained polymer was carried out rigorously as follows to ensure the removal of the catalyst side product:

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°C .

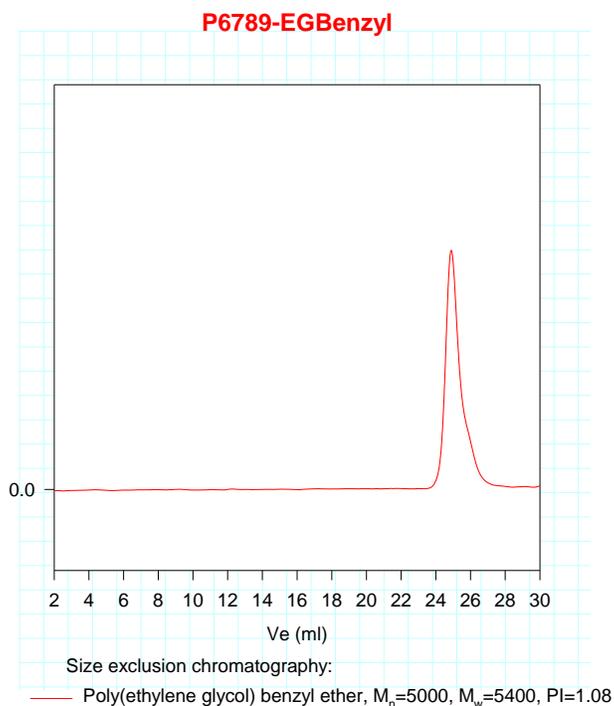
Solubility:

Poly(ethyl glycol) is soluble in toluene, THF, water and CHCl_3 . The polymer is insoluble in hexane, ether, isopropanol and cold ethanol.

^1H NMR of the polymer:



SEC for the polymer:



Thermal analysis of the P6789-EGBenzyl

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).

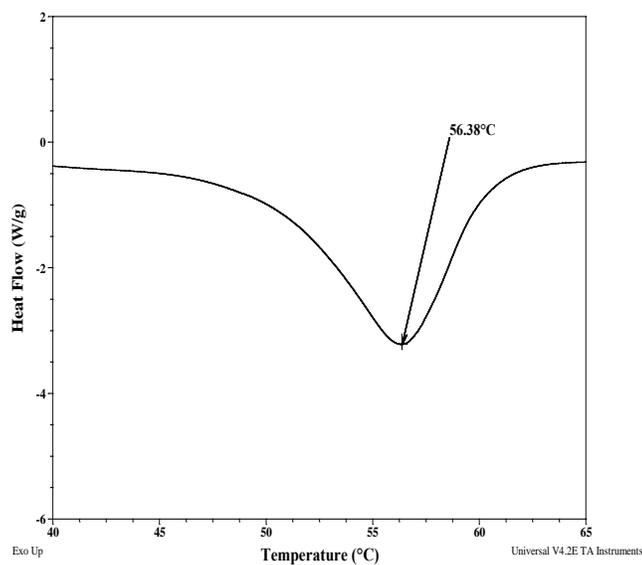
Melting and crystallization curve for the sample

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.

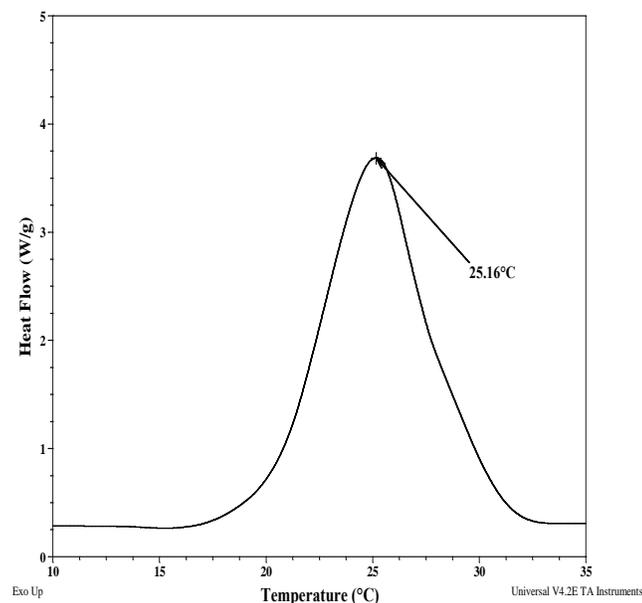
Thermal analysis results at a glance

Sample	T_m (°C)	T_c (°C)	T_g (°C)
EGBenzyl	56	25	-54

Melting curve for the polymer:



Crystallization curve for the polymer:



Thermogram for the PEO block

