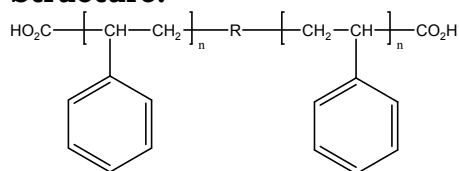


Sample Name:

**$\alpha,\omega$ -Carboxy Terminated Polystyrene**

Sample #: **P2752-S2COOH**

**Structure:**

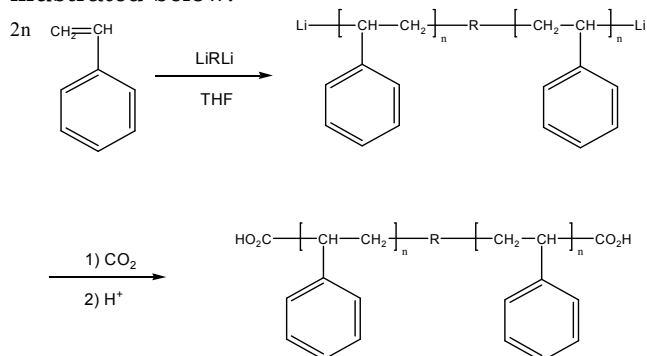


**Composition:**

$M_n \times 10^3$	PDI
4.5	1.12
Functionality	>1.95
$T_g$ ( $^{\circ}\text{C}$ )	104

### Synthesis Procedure:

The functionalized polymer was prepared by anionic living polymerization of styrene using bifunctional as initiator in THF followed by terminating the polymerization reaction with dried  $\text{CO}_2$ . The scheme of the reaction is illustrated below:



### Characterization:

The molecular weight and polydispersity index of this polymer were determined before the addition of the carboxy function by size exclusion chromatography (SEC) using a Varian liquid chromatograph equipped with a UV and refractive index detector. In our columns the polymer after termination with  $\text{CO}_2$  the elution is retarded. This is because of the strong interaction with the column packing material. Furthermore the  $M_w/M_n$  broadens because of that reason.

Polymer functionality was determined by the titration with NaOH using phenolphthalein as the indicator.

### Thermal analysis:

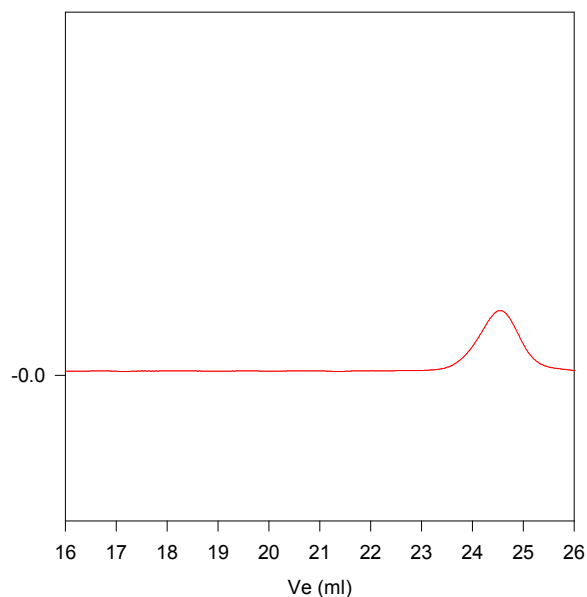
Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of  $10^{\circ}\text{C}/\text{min}$ . The midpoint of the slope change of the heat flow plot of the second heating scan was considered as the glass transition temperature ( $T_g$ ).

### Solubility:

Polymer is soluble in THF, Dioxane,  $\text{CHCl}_3$  and precipitated out from methanol/water, and in cold hexane.

### SEC of Sample:

**P2752-S2COOH**



Size exclusion chromatography of  $\alpha,\omega$ -dicarboxy terminated polystyrene.

$M_n=4500$ ,  $M_w=5000$  PI=1.12, functionality=1.95.

### DSC thermogram for the polymer:

