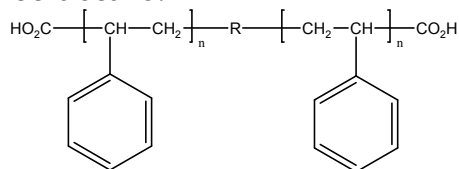


Sample Name:

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

Sample #: **P4309-S2COOH**

**Structure:**

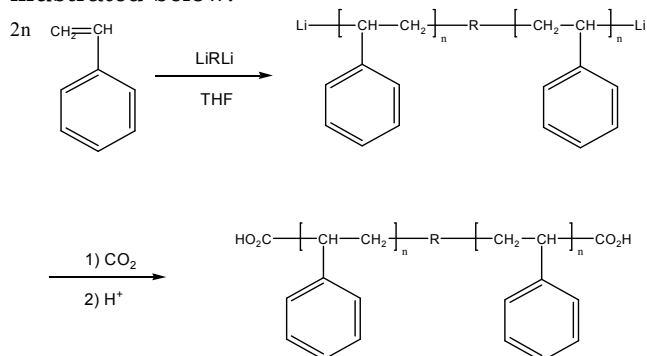


**Composition:**

$M_n \times 10^3$	PDI
120.0	1.10
Functionality	>1.90
$T_g$ (°C)	106

### 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 columns, after termination of  $\text{CO}_2$  with the polymer the elution is retarded due to strong interaction with the column packing material. In addition it leads to broaden the  $M_w/M_n$ . Polymer functionality was determined by the titration with NaOH using phenolphthalein as indicator.

### Thermal analysis:

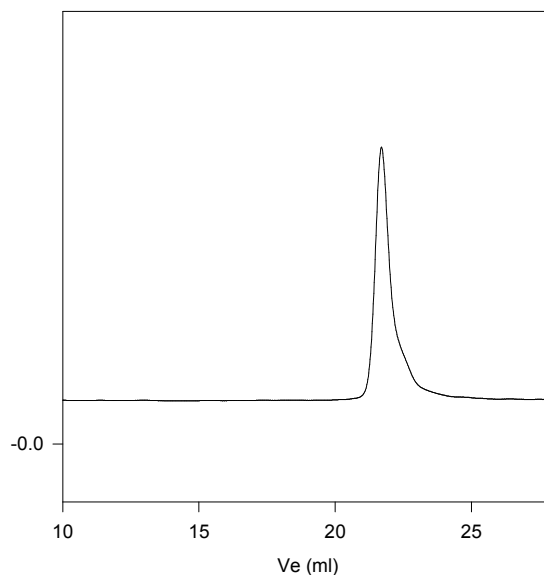
Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of  $10^\circ\text{C}/\text{min}$ . The midpoint of the slope change of the heat flow plot of the second heating scan was considered as the glass transition temperature ( $T_g$ ).

### Solubility:

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

### SEC of Sample:

**P4309-S2COOH**



Size exclusion chromatography of  $\alpha,\omega$ -dicarboxy terminated polystyrene before termination with  $\text{CO}_2$ :

$M_n=120000$ ,  $M_w=132000$ ,  $PI=1.10$ ,

functionality=1.90 by titration: Solution viscosity in THF at  $30^\circ\text{C}$ :  $0.632\text{dl/g}$   
Radius of Gyration:  $14.01\text{nm}$

### DSC thermogram for the polymer:

