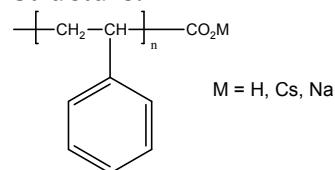


**Sample Name:**  
**Carboxy Terminated Polystyrene**

**Sample #: P2047- SCOOH**

**Structure:**

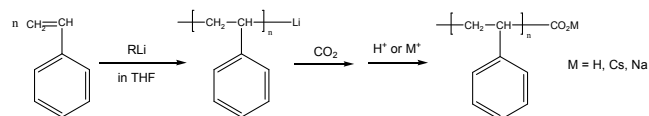


**Composition:**

$\text{Mn} \times 10^3$	PDI	Functionality %
6.5	1.13	>95
$T_g (^{\circ}\text{C})$	92	

**Synthesis Procedure:**

Carboxy Terminated Poly(styrene) was prepared by anionic living polymerization of styrene in THF followed by termination 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 addition of the  $\text{CO}_2\text{H}$  function, by size exclusion chromatography (SEC) using a Varian liquid chromatograph equipped with a UV and refractive index detector. Polymer functionality was determined by titration with NaOH using phenolphthalein as the indicator.

**Thermal analysis:**

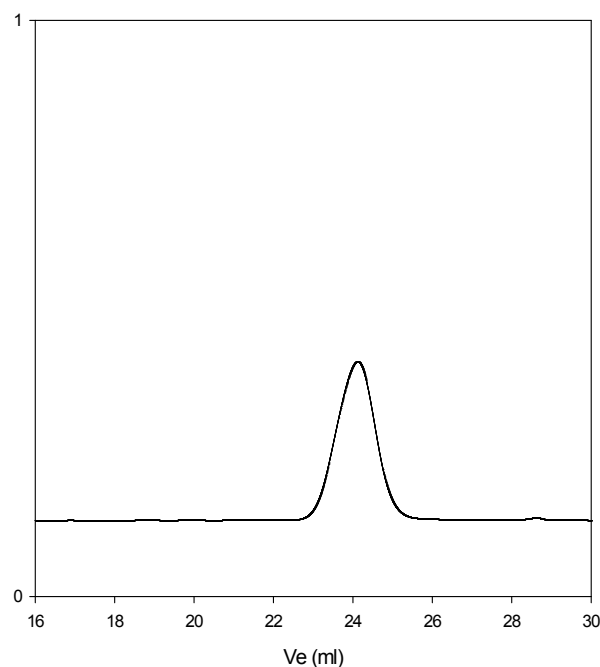
Thermal analysis of the samples was carried out using a differential scanning calorimeter (TA Q100) at a heating rate of  $10^{\circ}\text{C}/\text{min}$ . The inflection glass transition temperature ( $T_g$ ) has been considered.

**Solubility:**

Polymer is soluble in toluene, THF,  $\text{CHCl}_3$  and can be precipitated in water and cold methanol.

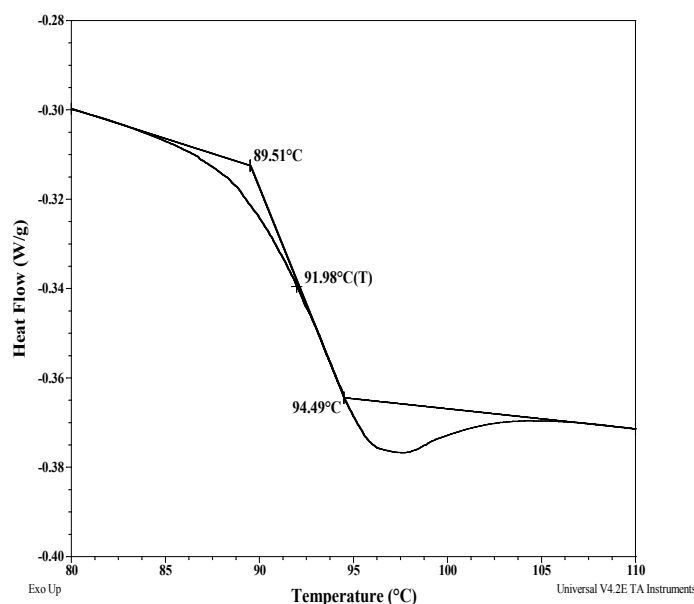
**SEC of Sample:**

P2047 SCOOH



Size exclusion chromatography of monocarboxy terminated polystyrene (before adding  $\text{CO}_2$ ).  $\text{Mn}=6500$ ,  $\text{Mw}=7345$ ,  $\text{PI}=1.13$ , functionality=1.00

**DSC thermogram for the sample:**



## Comparison of $T_g$ between polystyrene and carboxy terminated polystyrene

The glass transition temperature ( $T_g$ ) between polystyrene (PS) and carboxy terminated polystyrene (PSCOOH) both having  $M_n$  of 2000 are compared at heating rate of  $10^\circ\text{C}/\text{min}$ . It has been found that the  $T_g$  of PSCOOH was  $15^\circ\text{C}$  higher ( $79^\circ\text{C}$ ) than the corresponding PS ( $64^\circ\text{C}$ ). Thermograms for both samples are shown below:

