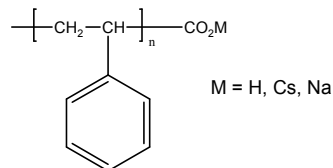


**Sample Name:**  
Carboxy Terminated Polystyrene

**Sample #: P3948- SCOOH**

**Structure:**

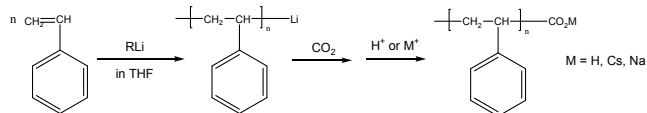


**Composition:**

Mn x 10 <sup>3</sup>	PDI	Functionality %
10.0	1.07	>95
T <sub>g</sub> (°C)	101	

**Synthesis Procedure:**

Carboxy Terminated Poly(styrene) was prepared by anionic living polymerization of styrene in THF followed by termination with dried CO<sub>2</sub>. The scheme of the reaction is illustrated below::



**Characterization:**

The molecular weight and polydispersity index of this polymer were determined before addition of the CO<sub>2</sub>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:**

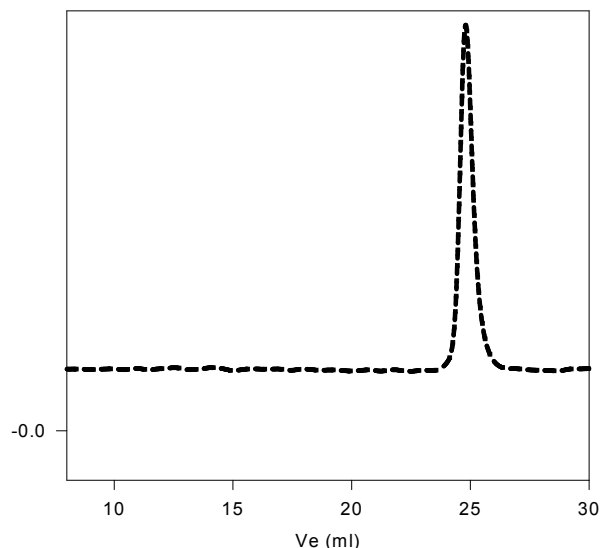
Thermal analysis of the samples was carried out using a differential scanning calorimeter (TA Q100) at a heating rate of 10°C/min. The inflection glass transition temperature (T<sub>g</sub>) has been considered.

**Solubility:**

Polymer is soluble in toluene, THF, CHCl<sub>3</sub> and can be precipitated in water and cold methanol.

**SEC of Sample:**

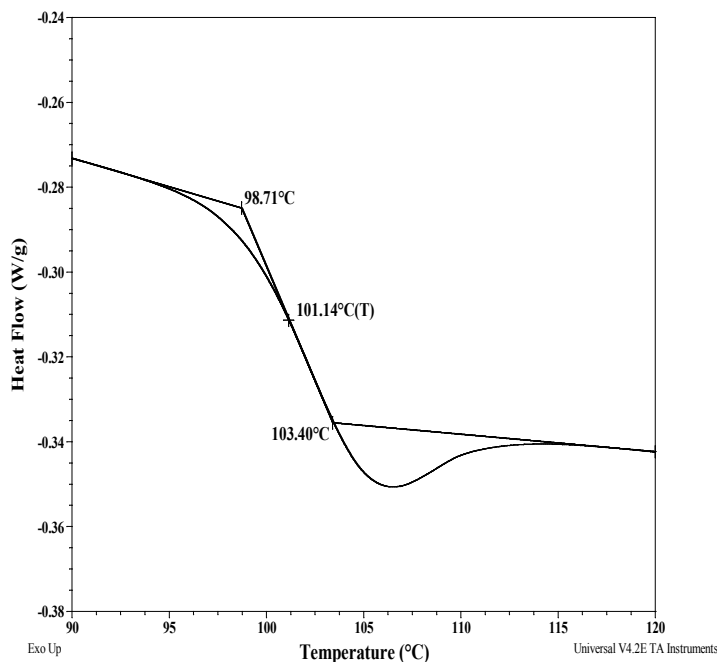
**P3948-SCOOH**



Size exclusion chromatography of monocarboxy terminated polystyrene (before adding CO<sub>2</sub>).

M<sub>n</sub>=10000, M<sub>w</sub>=10700 PI=1.07 functionality >99%

**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:

