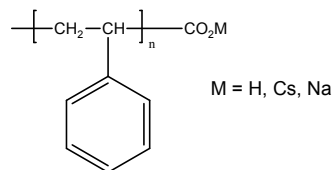


Sample Name:
Carboxy Terminated Polystyrene

Sample #: P2334- SCOOH

Structure:

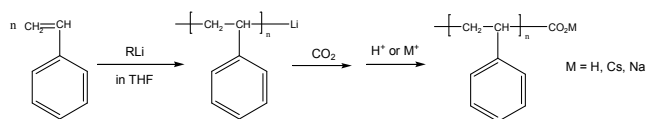


Composition:

Mn x 10 ³	PDI	Functionality %
4.2	1.20	100
T _g (°C)	78	

Synthesis Procedure:

Carboxy Terminated Poly(4-*t*-butyl styrene) was prepared by anionic living polymerization of *tert*-butyl styrene in THF followed by termination with dried CO₂. The scheme of the reaction is illustrated below:



Characterization:

The molecular weight and polydispersity index of this polymer were determined before addition of the CO₂H 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 solution using phenolphthalein as the indicator.

Thermal analysis:

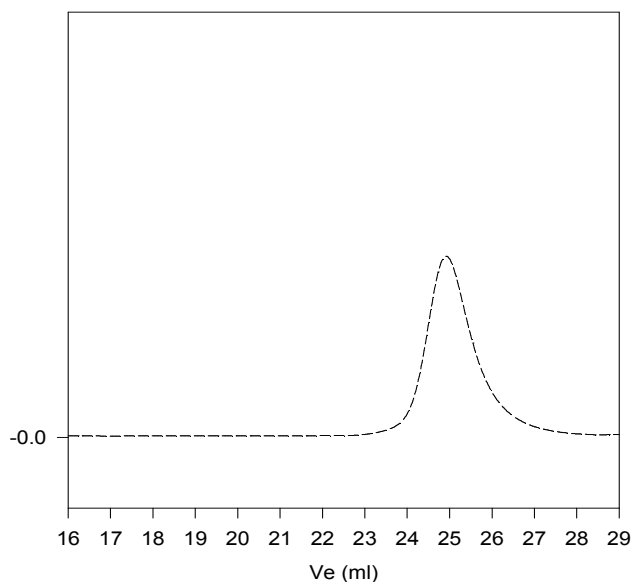
Thermal analysis of the samples was carried out using a differential scanning calorimeter (TA Q100) at a heating rate of 10°C/min. The inflection glass transition temperature (T_g) has been considered.

Solubility:

Polymer is soluble in toluene, THF, CHCl₃ and can be precipitated in water and cold methanol.

SEC of Sample:

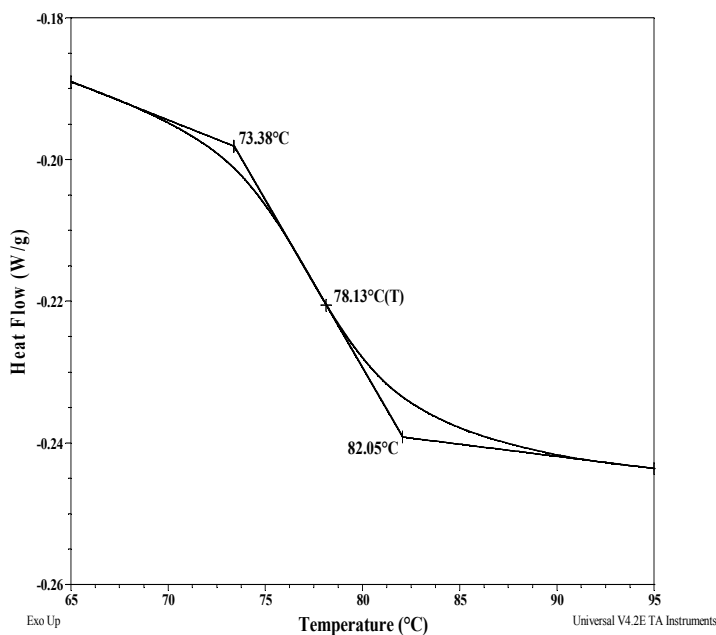
P2334-SCOOH



Size exclusion chromatography of monocarboxy terminated polystyrene (before adding Co₂).

M_n=4200, M_w=5000, PI=1.20, 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°C higher (79°C) than the corresponding PS (64°C). Thermograms for both samples are shown below:

