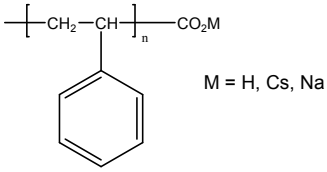
Sample Name:
Carboxy Terminated Polystyrene
Sample #: P3740- SCOOH

Structure:

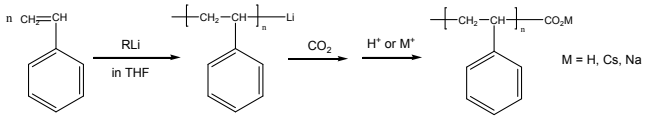


Composition:

Mn x 10^3	PDI	Functionality %
3.0	1.4	99.0
T_g (°C)	71	

Synthesis Procedure:

Carboxy Terminated Poly(styrene) was prepared by anionic living polymerization of styrene in THF followed by termination with dried 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 CO_2H 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.

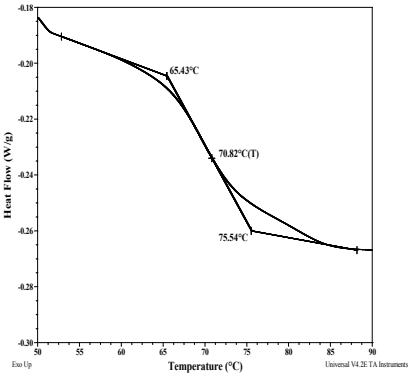
Thermal analysis:

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.

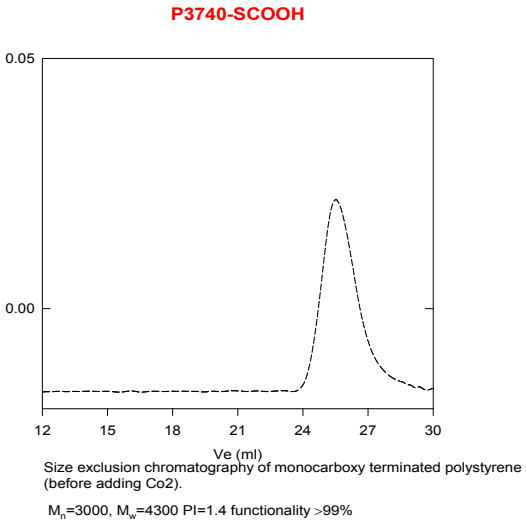
Solubility:

Polymer is soluble in toluene, THF, $CHCl_3$ and can be precipitated in water and cold methanol.

DSC theromogram for the sample:



SEC of Sample:



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

M_n=3000, M_w=4300 PI=1.4 functionality >99%

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°C/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: