

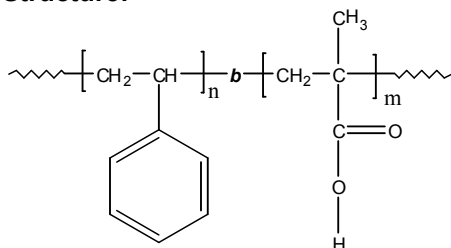
Sample Name:

Poly(styrene-b- methacrylic acid)

Polymethacrylic acid rich in isotactic microstructure)iso contents> 95%

Sample #: P6528-SiMAA

Structure:

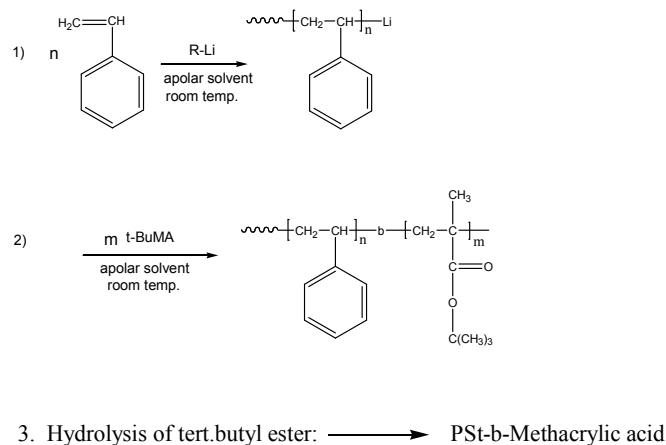


Composition:

Mn x 10 ³ PS-b-PMAA	PDI
45.8-b-1.45	1.07
Degree of polymerization: PS(440)-b-PMAA(17)	

Synthesis Procedure:

Poly(styrene-b- methacrylic acid) is prepared by living anionic polymerization with sequence addition of styrene followed by t-butyl methacrylate. Polymerization was carried out in Toluene. For the further information please see the reference.¹ The obtained polymer is hydrolysed in the presence of acid as catalyst. The reaction scheme is shown below:



Characterization:

An aliquot of the polystyrene block was terminated before addition of t-butyl acrylate and analyzed by size exclusion chromatography (SEC) to obtain the molecular weight and polydispersity index (PDI). The final block copolymer composition was calculated from ¹H-NMR spectroscopy or on line SEC with light scattering detectors. Block copolymer PDI is determined by SEC.

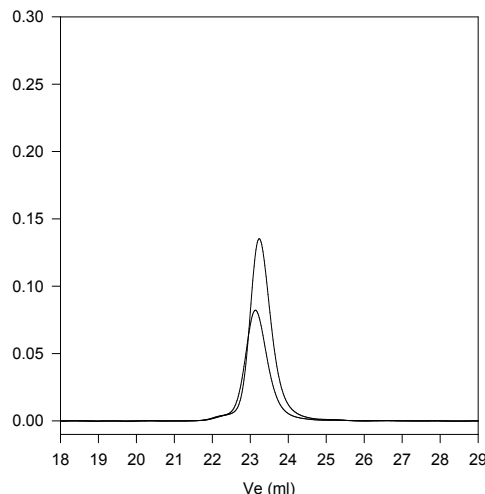
The hydrolysis of the tert. butyl ester to acid was followed by FT-IR spectroscopy by disappearance of characteristic absorbance at 1362cm⁻¹ of tert.butyl group.

Solubility:

Poly(styrene-b-methacrylic acid) is soluble in THF, dioxane and also in methanol (depending on the compositions with a short segment of polystyrene with long segment of poly meth acrylic acid). The polymers is precipitated out from ether, hexane.

SEC of the block copolymer:

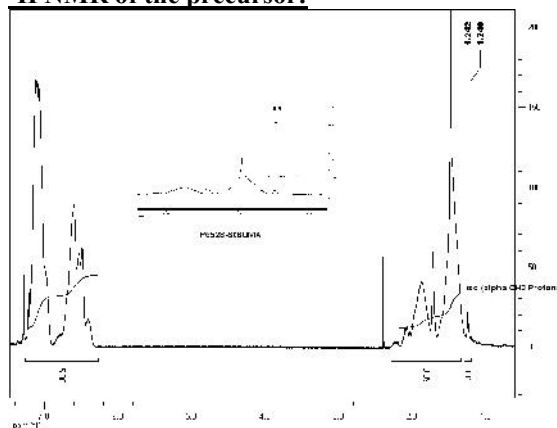
P6528-StBuMA Precursor for P6528-SMAA



Size exclusion chromatography of polystyrene-b-poly(t-butyl methacrylate)

— Polystyrene, $M_n=45800$, $M_w=49000$, $PI=1.07$
— Block Copolymer PS(45800)-b-PtBuMA(2400), $PI=1.07$
after Hydrolysis of tert.butyl ester:
 M_n : PSt(45800)-b-MAA(1450) M_w/M_n 1.07
Degree of Polymerization: PS(440)-b-PMAA(17)

¹H NMR of the precursor:



Reference:

S. K. Varshney, Z. Gao, Xing Fu Zhong, A. Eisenberg
“Effect of Lithium Chloride on the “Living” Polymerization of tert-Butylmethacrylate and Polymer Microstructure Using Monofunctional Initiators” Macromolecules, 1994, 27, 1076.