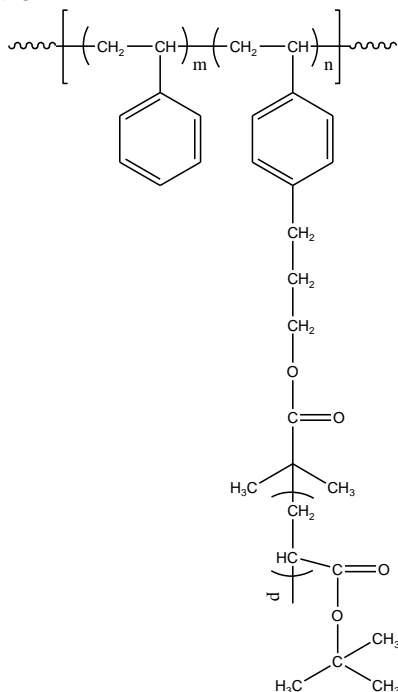


Sample Name: **Polystyrene grafted with poly acrylic acid**

Sample #: **P14643A-StBuAcomb**

Structure:

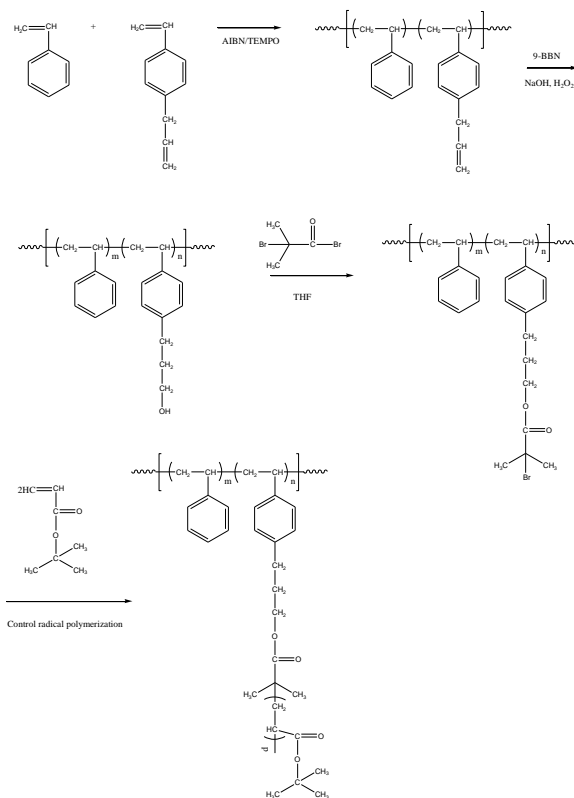


Composition:

Mn x 10 ³ (Styrene main chain)	40.4
Mn x 10 ³ (Each PtBuA graft chain)	3.5
Mw/Mn	6.1
Ratio of m:n (mol/mol by NMR)	7 : 1
Number of branching in polymer	48

Synthesis Procedure:

The brief synthetic route is illustrated as following scheme. The styrene-co-allyl styrene was firstly prepared, followed by the hydroxylation of double bond of allyl group, and then the polymer was reacted with 2-bromo isobutyryl bromide to form bromo-functionalized polymer. Poly(tert-butyl acrylate) was grafted onto the polymer by controlled radical process.



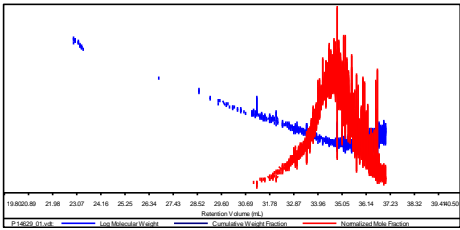
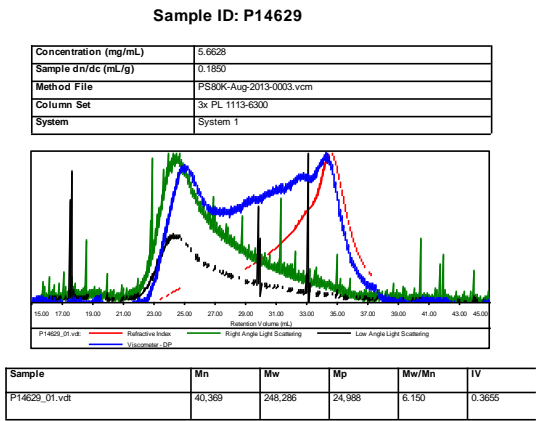
Characterization:

The molecular weight and polydispersity index (PDI) of polymers are obtained by light scattering size exclusion chromatography. The composition of styrene-co-allyl styrene copolymer is determined by NMR by comparing the double bond at 5.97 ppm and 5.06 ppm to the aromatic protons. The hydroxylation was confirmed by the disappearance of double bond proton and the esterification was proved by the appearance of methylene group adjacent to the ester groups at 4.16ppm. The molecular weight of polytert butyl acrylate grafting chain was determined by proton NMR.

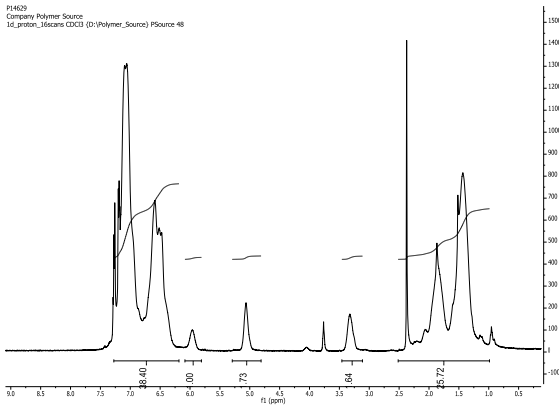
Solubility:

The grafted polymer is soluble in THF, DMF, chloroform.

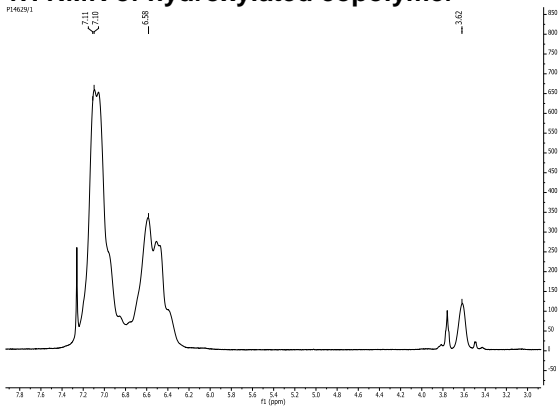
SEC of poly(styrene-co-allyl styrene):



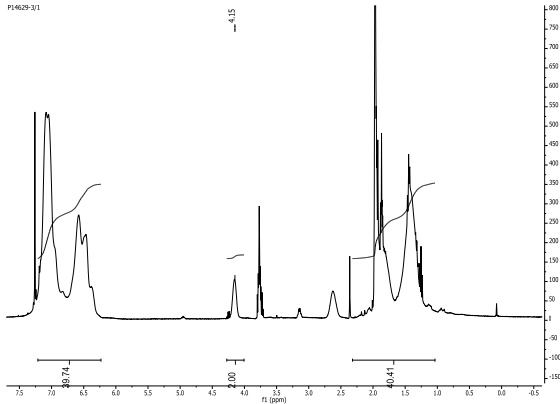
1H NMR of Poly(styrene-co-allyl styrene)



1H NMR of hydroxylated copolymer



1H NMR of bromo-functionalized copolymer



1H NMR of poly(styrene-graft-tert butyl acrylate)

