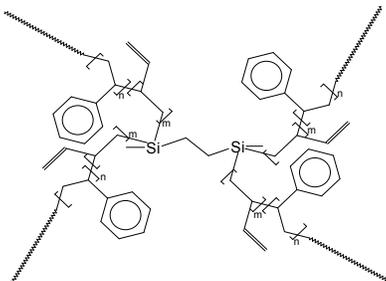


Four-Arm Poly(styrene-*b*-butadiene)

Sample # P 488-4SBd

Chemical Structure:

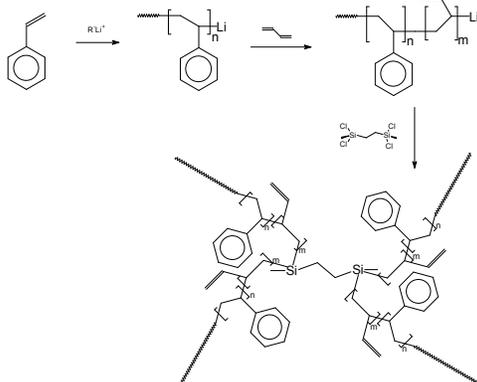


CompositionS:

Mn x 10 ³ (branch)	PDI
10.2-b-9.4	1.04

Polymerization:

Four arm-polystyrene-*b*-butadiene was prepared by anionic living polymerization of by sequential addition of styrene and butadiene in THF at -10 °C, followed by linking reaction with tetrachloro substituted silane compound. 1,4-Dimethyl-1,1,4,4-tetrachloro-1,2-disilethylene [Cl₂Si(CH₃)-CH₂CH₂-Si(CH₃)Cl₂] was sublimed and sealed in a break-seal ampoule. It was used as the linking agent. The scheme of the reaction is illustrated below:



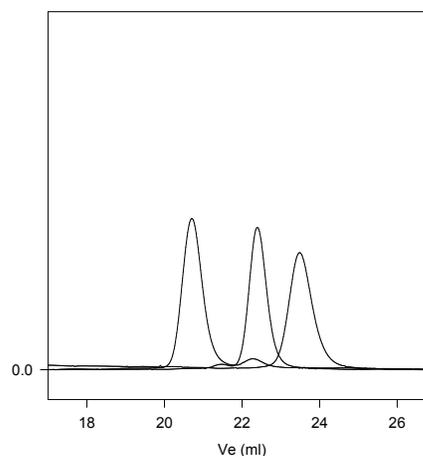
Characterization:

Molecular Weight: The molecular weights and the polydispersity indice of first block in side arm were calculated. The chemical composition of side arm was calculated on the basis of NMR and molecular weight of first block. The absolute molecular weight of star-like polymer was determined from Light Scattering detector.

The composition of the block copolymers was calculated by taking the ratio of the peak area of the protons on the double bonds of polybutadiene at 4.9 - 5.6 ppm to that of aromatic protons of polystyrene at 6.3-7.2 ppm. The molecular weight of polybutadiene was then calculated from this composition and the molecular weight of PS obtained by SEC.

The 1,2 content was calculated by taking the ratio of the peak area at 5.2-5.6 ppm (-CH=CH- and -CH=CH₂) to that at 4.9-5.0 ppm (=CH₂). It was found that the polybutadiene contains 90.7% of 1,2 units.

P488-4SBd



Size exclusion chromatography of polystyrene-*b*-polybutadiene

- Polystyrene, M_n=10200, M_w=11000, PI=1.08
- Block Copolymer PS(10200)-*b*-PBd(9400), PI=1.03
- Four-arm Block Copolymer (PS(10200)-*b*-PBd(9400))₄X, PI=1.04

