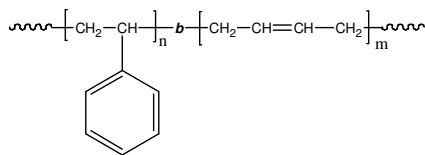


**Sample Name:** Poly(styrene-b-1,4-butadiene)

**Sample #:** P4838-SBd

**Structure:**

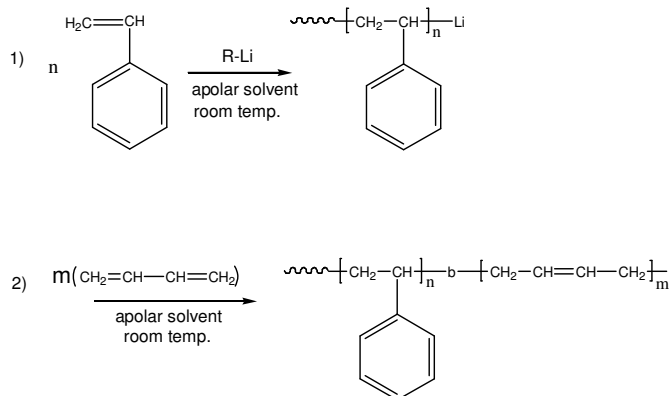


**Composition:**

$M_n \times 10^3$	PDI
S-b-Bd (k)	
45.0-b-0.4	1.05

**Synthesis Procedure:**

Poly(styrene-b-butadiene) rich in 1,4 addition polybutadiene is prepared by living anionic polymerization with sequence addition of styrene followed by butadiene (Bd) in an apolar solvent such as cyclohexane, benzene or in toluene. The scheme of the polymerization reaction is illustrated below:



**Characterization:**

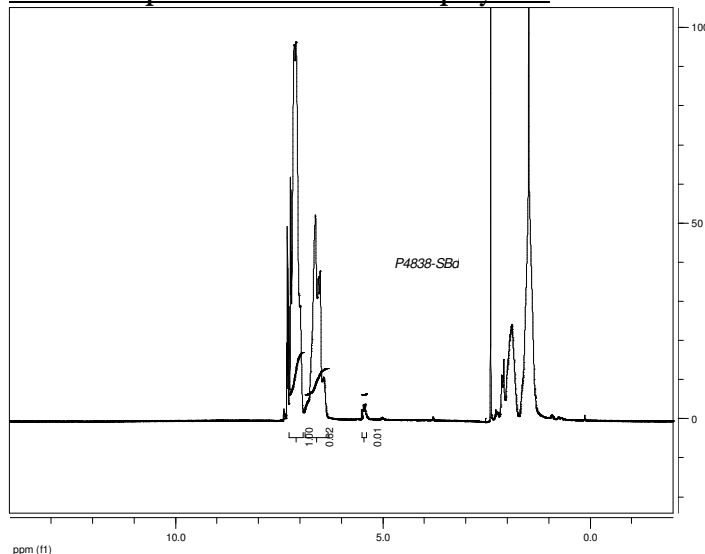
An aliquot of the anionic polystyrene block was terminated before addition of butadiene and analyzed by size exclusion chromatography (SEC) to obtain the molecular weight and polydispersity index (PDI).

The final block copolymer composition was calculated from  $^1\text{H-NMR}$  spectroscopy by comparing the peak area of the polybutadiene protons (double bond 4.9 - 5.6 ppm) with the aromatic protons of polystyrene at 6.3-7.2 ppm.  $^1\text{H-NMR}$  spectroscopy shows that the copolymer contains mostly 1,4-addition butadiene microstructure (> 90%) (approx. 5.30-5.65 ppm) with a small contribution from 1,2-addition butadiene (approx. 5.00 ppm). Copolymer PDI is determined by SEC.

**Solubility:**

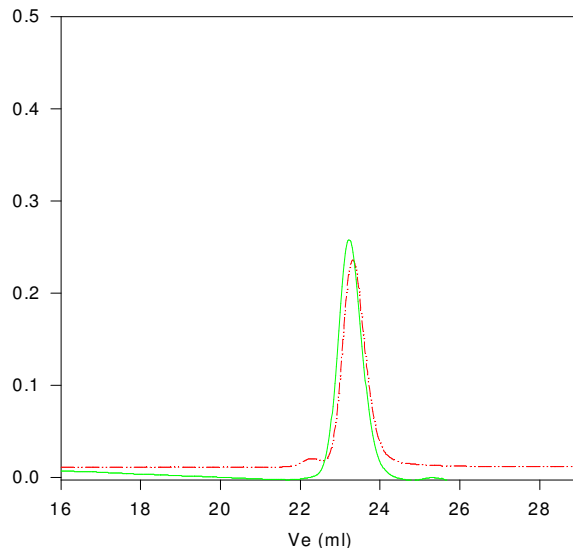
Poly(styrene-b-butadiene) is soluble in toluene, cyclohexane, benzene, THF, dioxane and  $\text{CHCl}_3$ . This polymer readily precipitates from methanol, ethanol, and water.

**$^1\text{H-NMR}$  Spectrum of the block copolymer:**



**SEC of the block copolymer:**

**P4838-SBd**



Size exclusion chromatography of polystyrene-b-polybutadiene (1,2 addition)

--- Polystyrene,  $M_n=45000$ ,  $M_w=47500$ ,  $PI=1.05$   
--- Block Copolymer PS(45000)-b-PBd(400),  $PI=1.05$   
Molecular Composition of diblock from  $^1\text{H-NMR}$