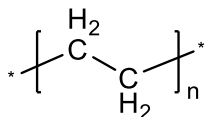


**Sample Name: Polyethylene**

**Sample #: P19644A-E**

**Structure:**



**Composition:**

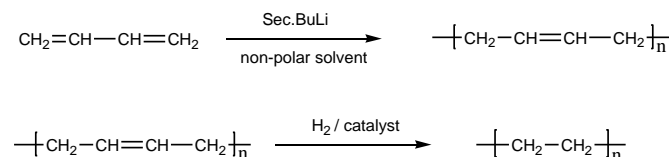
$M_n \times 10^3$ (g/mol)	$M_w/M_n$
65.0	1.02

**Thermal properties:**

Melting point, $T_m$	Crystallization point, $T_{cr}$
105 °C	90 °C

**Synthesis procedure:**

The polyethylene was obtained by hydrogenation of poly(1,4-butadiene), which was synthesized by living anionic polymerization of butadiene in non-polar solvent. The scheme of reaction is presented below:



**Characterization:**

Proton NMR spectroscopy was used to confirm the structure of polybutadiene rich in 1,4-addition.

The complete hydrogenation of the product was confirmed by FT-IR spectroscopy analysis by disappearance of the alkene double bond.

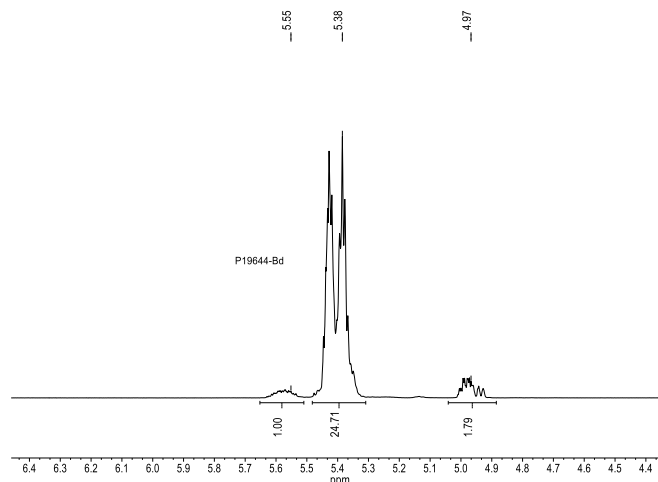
The molecular weight and polydispersity index were obtained by size exclusion chromatography (SEC) of poly(1,4-butadiene) precursor using THF as an eluent; and the molecular weight of polyethylene was calculated accordingly.

Thermal analysis was performed on TA Instruments Q100 differential scanning calorimeter (DSC) under a nitrogen atmosphere at a scan rate 10 °C/min.

**Solubility:**

Polyethylene is soluble in hot toluene and hot chlorobenzene. The polymer is insoluble in hexane, methanol, and ethers.

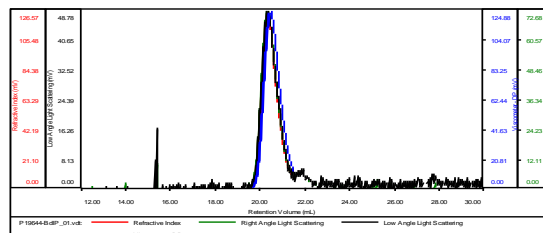
**<sup>1</sup>H NMR spectrum of poly(1,4-butadiene) precursor:**



**SEC chromatogram of poly(1,4-butadiene):**

Sample ID-PD19644-Bd

Concentration (mg/mL)	0.7622
Sample dn/dc (mL/g)	0.1250
Method File	PS80K-June30-2015-0000.vcm
Column Set	3x PL 1113-6300
Solvent	THF



Sample	MW Number Average (Da)	MW Weight Average (Da)	MW at Peak (Da)	Polydispersity	Intrinsic Viscosity (dL/g)
P19644-BdP_01.vdi	62,241	62,316	60,446	1.001	3.8470

**DSC thermograms of the polyethylene:**

1<sup>st</sup> cooling (upper) and 2<sup>nd</sup> heating (lower) scans, both performed at a rate 10 °C/min.:

