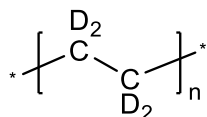


**Sample Name:** Deuterated Polyethylene-d<sub>4</sub>

**Sample #:** P42213-dPE

**Structure:**



**Composition:**

$M_n \times 10^3$ (g/mol)	$M_w/M_n$
57.0	1.02

**Thermal properties:**

Melting point, $T_m$	Crystallization point, $T_{cr}$
102 °C	86 °C

**Synthesis procedure:**

The polyethylene-d<sub>4</sub> was obtained by deuteration of poly(1,4-butadiene-d<sub>6</sub>), which was synthesized by living anionic polymerization of butadiene-d<sub>6</sub> in non-polar solvent.

**Characterization:**

Deuterium NMR spectroscopy was used to confirm the structure of polybutadiene-d<sub>6</sub> rich in 1,4-addition.

The complete deuteration of the product was confirmed by FT-IR spectroscopy analysis by disappearance of alkene double bond (C=C at 971 cm<sup>-1</sup>).

The molecular weight and polydispersity index were obtained by size exclusion chromatography (SEC) of poly(1,4-butadiene-d<sub>6</sub>) precursor using THF as an eluent; and the molecular weight of polyethylene-d<sub>4</sub> was calculated accordingly.

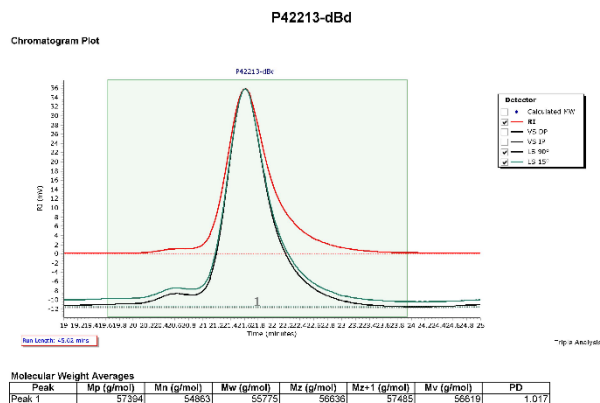
Thermal analysis was performed on TA Instruments Q100 differential scanning calorimeter (DSC) under a nitrogen atmosphere at a scan rate 10 °C/min.

**Solubility:**

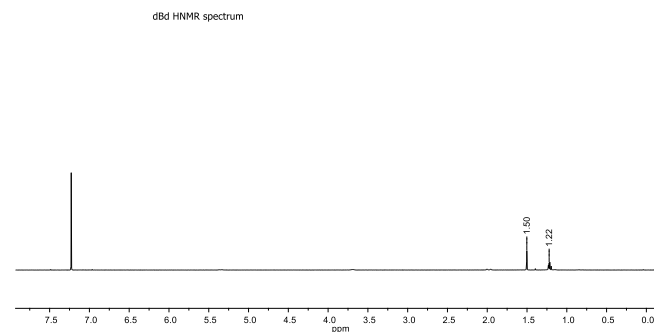
Polyethylene-d<sub>4</sub> is soluble in hot toluene and xylene. The obtained solution has light ivory color; this coloration is due to the presence of trace amount (we expect <5–6 ppm) of the Wilkinson catalyst used in synthesis (which is hard to remove from the final product).

**SEC chromatogram of dBd precursor:**

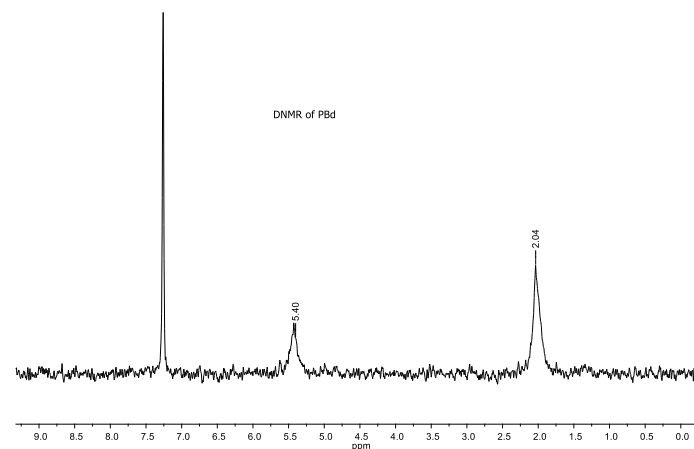
Agilent GPC/SEC Software



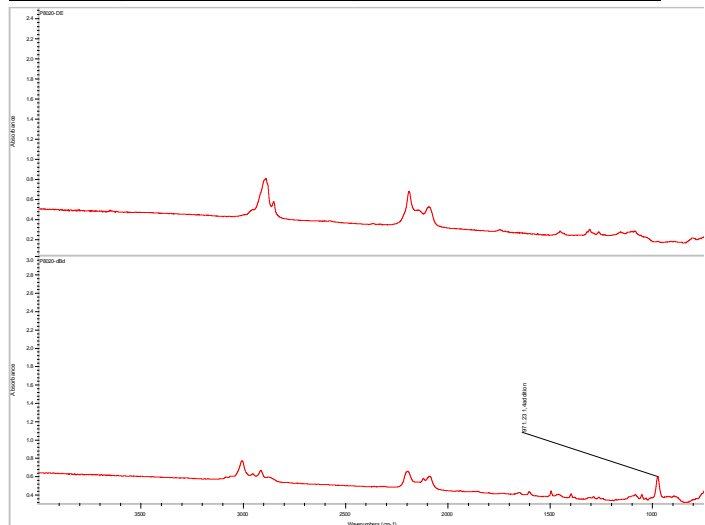
**H NMR spectrum of dBd precursor:**



**D NMR spectrum of PBd precursor:**



**FT-IR spectra of dPE (top) and dPBd (bottom):**



**DSC thermogram:**

heating (*bottom*) and cooling (*top*) scans at 10 °C/min.

