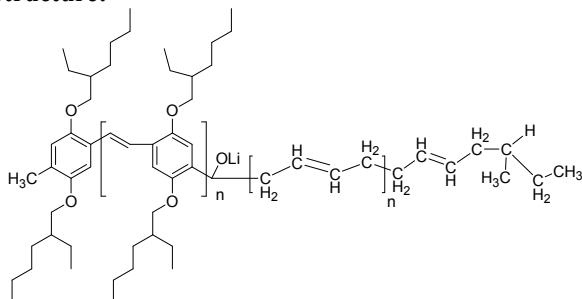


**Poly(2,5-di(2'-ethylhexyloxy)-1,4-phenylenevinylene)-
b-Bd (1,4 rich addition)**

Structure:



Mn x 10 ³ DEHPPV-b-Bd	PDI
3.3-b-4.0	1.5

Synthesis of such diblock copolymers was carried out in two steps:

1. synthesis DEH-PPV bearing end group of aldehyde:
2. Reaction of Poly butadiene living lithium salt with aldehyde terminated DEH_PPV. Followed by rigorous fractionation to remove any untreated poly butadiene fractions.
3. Aldehyde end group DEH-PPV is synthesized by polymerization of Seigrüst polycondensation under basic condition in DMF, followed by hydrolysis in acidic water. The polymer was then dissolved in chloroform and washed with distilled water until neutral, dried over MgSO_4 and precipitated into cold methanol.

CC(C)(C)c1ccc(O)cc1 + BrCc1ccc(C(C)(C)C)cc1 $\xrightarrow[80\text{ }^{\circ}\text{C}]{\text{KOH}}$ CC(C)(C)c1ccc(Oc2ccc(C(C)(C)C)cc2)cc1

CC(C)(C)c1ccc(Oc2ccc(C(=O)c3ccc(Oc4c(C(C)(C)C)cc(C(C)(C)C)c4)cc3)cc2)cc1 $\xrightarrow[\text{POC13}]{\text{DMF}}$ CC(C)(C)c1ccc(Oc2ccc(C(=Nc3ccccc3)cc4ccc(Oc5c(C(C)(C)C)cc(C(C)(C)C)c5)cc4)cc2)cc1

CC(C)(C)c1ccc(Oc2ccc(C(=Nc3ccccc3)cc4ccc(Oc5c(C(C)(C)C)cc(C(C)(C)C)c5)cc4)cc2)cc1 $\xrightarrow[\text{KOtBu}]{\text{DMF}}$ CC(C)(C)c1ccc(Oc2ccc(C(=Nc3ccccc3)cc4ccc(Oc5c(C(C)(C)C)cc(C(C)(C)C)c5)cc4)cc2)cc1

Chemical reaction scheme showing the synthesis of a poly(1,3-butadiene) with a poly(2-vinylpyridine) graft. The reaction involves the addition of isobutyl lithium ($\text{H}_3\text{C}-\text{C}(\text{CH}_3)_2-\text{CH}_2-\text{Li}$) to 1,3-butadiene ($\text{CH}_2=\text{CH}-\text{CH}=\text{CH}_2$) in cyclohexane. The resulting polymer structure is a poly(1,3-butadiene) chain with a poly(2-vinylpyridine) graft. The graft consists of a poly(2-vinylpyridine) backbone with isobutoxy side chains. The main chain is a poly(1,3-butadiene) with a terminal isobutoxy group and a terminal vinyl group.

The molecular weight was obtained by ^1H NMR by comparing the end aldehyde group at 10.5 ppm to aromatic proton at 7.54 ppm or vinyl proton at 7.26 ppm for the aldehyde end functionalized prepolymer followed by block copolymer.

MEH-PPV-Bd is soluble in THF, CHCl₃, hexane.

¹H NMR spectrum of 2,2,4,4-tetramethyl-3-pentanone. The spectrum shows three main signals: a singlet at 1.00 ppm (12H), a singlet at 1.70 ppm (12H), and a singlet at 1.52 ppm (12H). The x-axis is chemical shift in ppm from 0 to 10.5. The y-axis is intensity from 0 to 1000. Integration values are 1.00, 17.00, and 15.22.