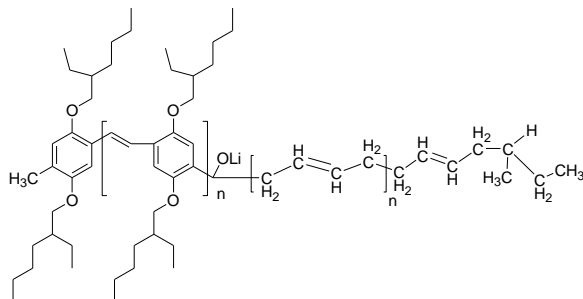


Poly(2,5-di(2'-ethylhexyloxy)-1,4-phenylenevinylene)-b-Bd (1,4 rich addition)

Structure:



Mn x 10 ³ DEHPPV-b-Bd	PDI
3.0-b-8.8	1.4

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 Seigrst 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 MgSO₄ and precipitated into cold methanol.

The reaction scheme shows the polymerization of 1,3-butadiene initiated by a lithium carbanion in cyclohexane. The initiator is a lithium carbanion of 2-methyl-2-butene, represented as $\text{H}_3\text{C}-\text{C}(\text{CH}_3)(\text{CH}_2\text{CH}_3)\text{Li}^-$. The reaction is carried out in cyclohexane, indicated by the label "Cyclohexane" above the reaction arrow. The product is a poly(1,3-butadiene) chain with a lithium end group, shown as $\text{H}_3\text{C}-\text{C}(\text{CH}_3)(\text{CH}_2\text{CH}_3)\text{O}-\text{Ar}-[\text{CH}_2-\text{CH}(\text{CH}_2\text{CH}_3)]_n-\text{CH}_2-\text{CH}(\text{CH}_2\text{CH}_3)-\text{Li}^+$, where Ar represents a substituted benzene ring with two isopropoxy groups.

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.

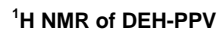
[illegible]

CC1=C(O)C(=C(C)C)C(O)=C1 + BrCCCC(C)C $\xrightarrow[80\text{ }^{\circ}\text{C}]{\text{KOH}}$ CC1=C(C)C(=C(C2=CC(OC(C)C(C)C)C=C2)C(OC(C)C(C)C)=C1

CC1=C(C)C(=C(C2=CC(OC(C)C(C)C)C=C2)C(OC(C)C(C)C)=C1 $\xrightarrow[\text{POCl}_3]{\text{DMF}}$ CC1=C(C)C(=C(C2=CC(OC(C)C(C)C)C=C2)C(OC(C)C(C)C)=C1 + Nc1ccccc1 \rightarrow CC1=C(C)C(=C(C2=CC(OC(C)C(C)C)C=C2)C(OC(C)C(C)C)=C1

CC1=C(C)C(=C(C2=CC(OC(C)C(C)C)C=C2)C(OC(C)C(C)C)=C1 $\xrightarrow[\text{KOtBu}]{\text{DMF}}$ CC1=C(C)C(=C(C2=CC(OC(C)C(C)C)C=C2)C(OC(C)C(C)C)=C1

BCI
(PLANNING)



- Poly(2,5-di-(2-ethylhexyloxy)-1,4-phenylenevinylene, $M_n=3000$, $M_w=4300$, $M_w/M_n=1.45$)
- PBd $M_n=8,800$, $M_w/M_n=1.10$
- After linking reaction DEHPPV-Bd $M_n=DEHPPV(3000)-b-(8,800)$, $M_w/M_n=1.4$