Supplementary Information for

Amphiphilic Conjugated Molecules with Multifunctional Properties as Efficient Blue Emitters and Cathode Interlayers for Inkjet Printed Organic Light-Emitting Diodes

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General Methods

All reagents and solvents, unless otherwise specified, were obtained from Aldrich, Acros, and TCI Chemical Co. and were used as received. The vessel was then sealed and heated in CEM Discover system. Column chromatography was carried out on silica gel (200-300 or 300-400 mesh). OLED devices were fabricated on prepatterned indium-tin oxide (ITO) with a sheet resistance of 15-20 Ω/square. PEDOT:PSS were sourced from Xi'an Polymer Light Technology Corp. and used as received.

^{1}H NMR and ^{13}C NMR spectra were recorded on a Bruker 400 plus at 295 K. The MALDI-TOF mass spectroscopy measurements were carried out with a Bruker mass spectrometer use trans-2-[3-(4-tert-Butylphenyl)-2-methyl-2-propenylidene]malononitrile as matrix. Elemental analysis was conducted with a Carlo Erba-1106 instrument. Cyclic voltammetry (CV) was performed on an Eco Chemie's Autolab at room temperature under nitrogen.

UV–visible (UV–vis) absorption spectra were determined with a Shimadzu UV-3600 spectrophotometer. Fluorescence spectra were measured on Shimadzu RF-5300PC with a xenon lamp as a light source. The fluorescence quantum yields were determined by full-featured stead state/transient fluorescence spectrometer FLS-920 from Edinburgh Instruments. All fluorescent lifetimes were determined from the data using the Edinburgh Instruments software package. The EL spectra of the devices were determined using a spectrophotometer (Photo Research PR655 SpectraScan). The luminance-current-voltage characteristics of the devices were recorded using a combination of a source meter (Keithley 2602) and a luminance meter. Differential scanning calorimetry (DSC) and thermo-gravimetric analysis (TGA) were done on Shimadzu DSC-60A and DTG-60A equipment, respectively. AFM measurements of surface morphology were conducted on the Bruker ScanAsyst AFM in autoscan (AC) mode. All the devices were characterized without encapsulation, and the measurements were carried out under ambient condition at room temperature. Small-angle X-ray diffraction pattern (XRD) was recorded by Bruker D8 advance. Amplified Spontaneous Emission were determined with a Q-switched Nd:YAG laser pumped optical parametric amplifier (Spectron SL450) . The US FUJIFILM Dimatix 3000 model printer was used for inkjet printing. The solvent density of inks was determined on Anton Paar DWA-4100W Denstit

Meter. The measurements of viscosity and surface tension were conducted by EZ-Pinplus instrument.

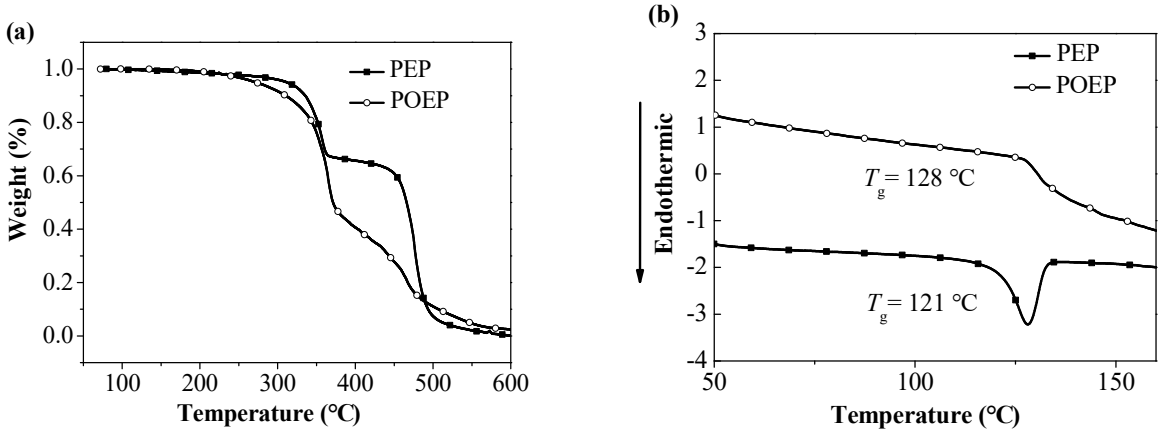

Fig. S1 TGA (a) and DSC (b) curves of PEP and POEP.

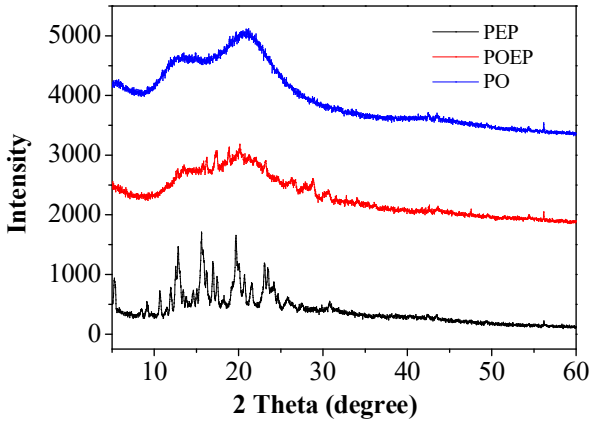

Fig. S2 WAXD patterns (5-60º) of PEP, POEP and PO powders. All samples were tested under the same conditions and each pattern was at its original intensity.

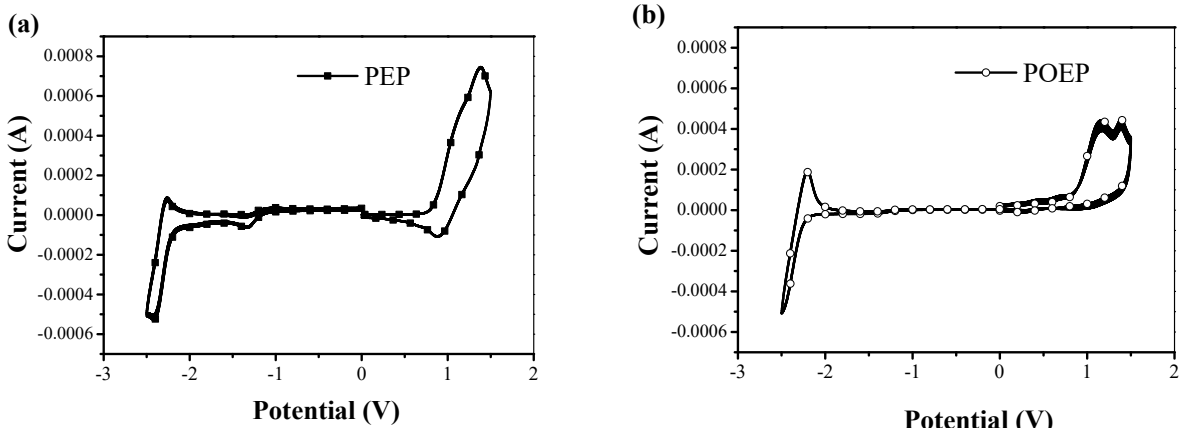

Fig. S3 Cyclic voltammograms of (a) PEP and (b) POEP.

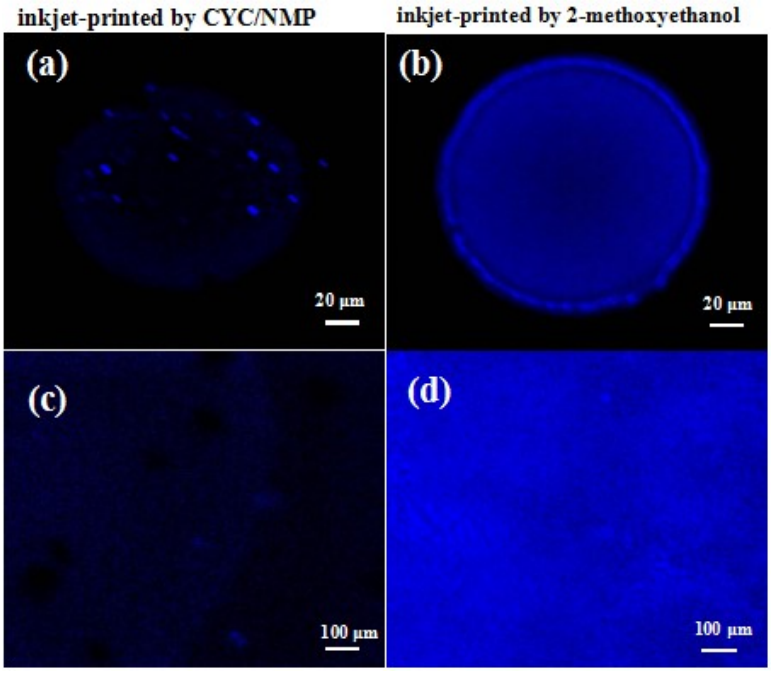

Fig. S4 Fluorescence confocal microscopy images of PEP on glass substrates of the inkjet-printed (a) dot and (c) films with CYC/NMP as solvent, and the inkjet-printed (b) dot and (d) films with 2-methoxyethanol as solvent.

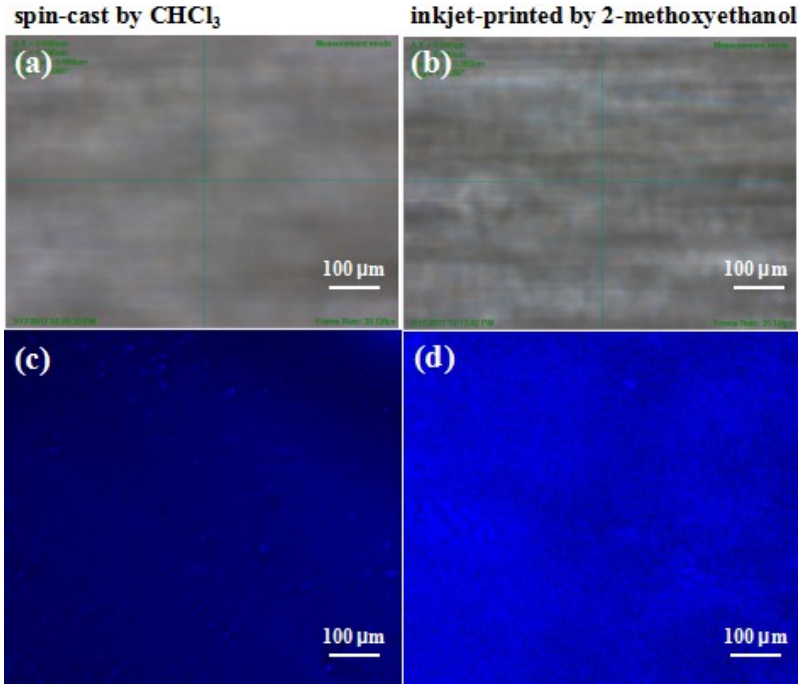

Fig. S5 Optical microscope images of PEP on glass substrates of (a) the spin-cast films from chloroform solution, and (b) the inkjet-printed films with 2-methoxyethanol as solvent; fluorescence confocal microscopy images of PEP on glass substrates of (c) the spin-cast films from chloroform solution, and (d) the inkjet-printed films with 2-methoxyethanol as solvent.

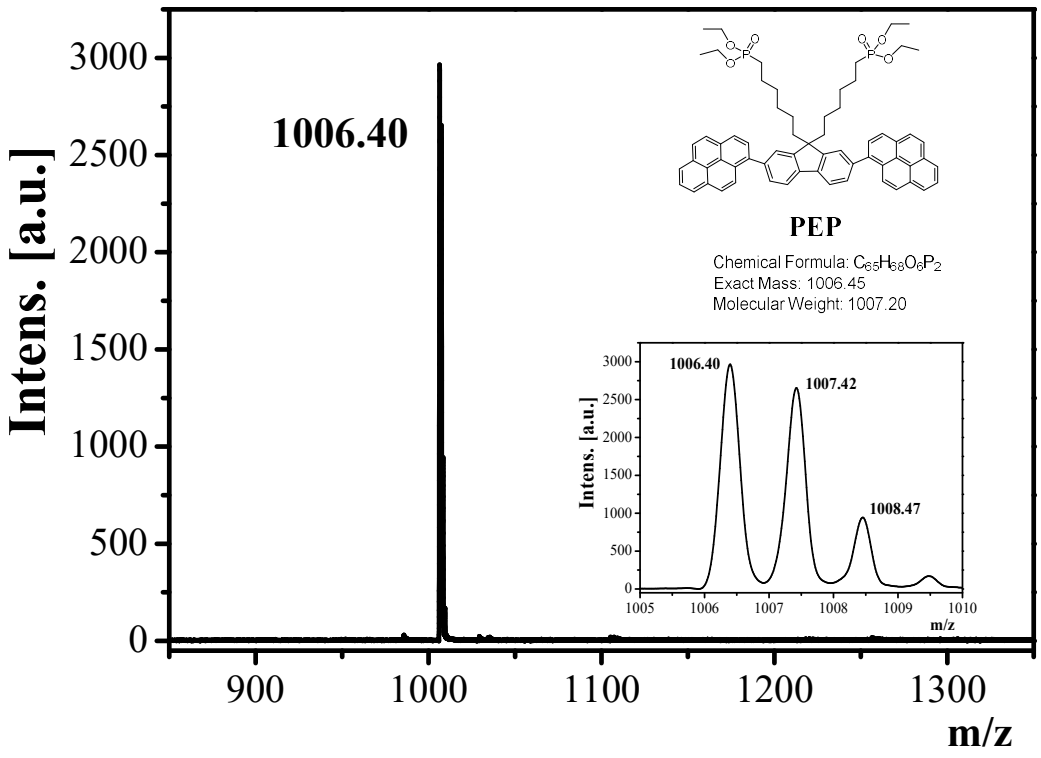

Fig. S6 MALDI-TOF mass spectra for PEP.

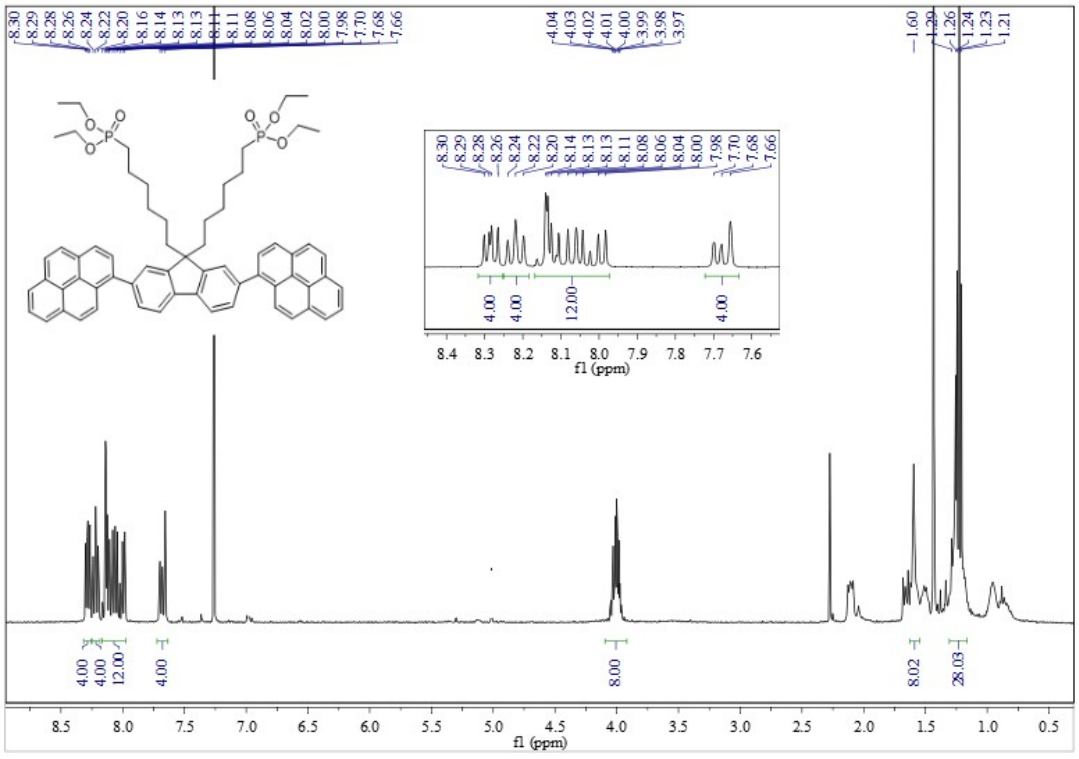

Fig. S7 ^{1}H NMR spectra of PEP in $CDCl_3$.

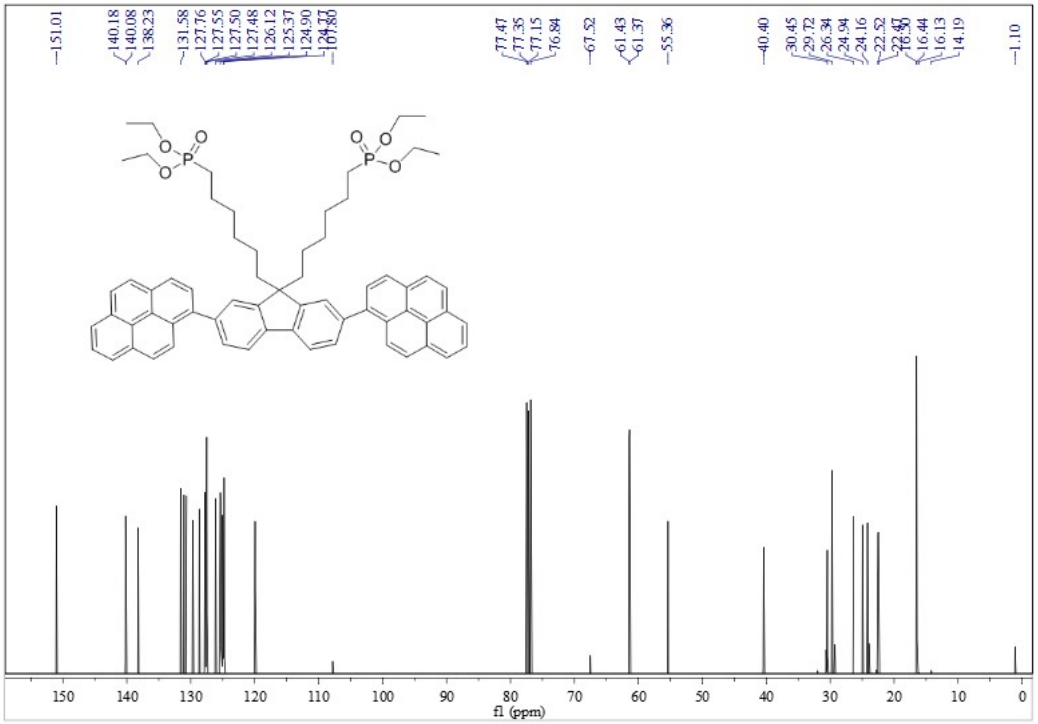

Fig. S8 ^{13}C NMR spectra of PEP in $CDCl_3$.

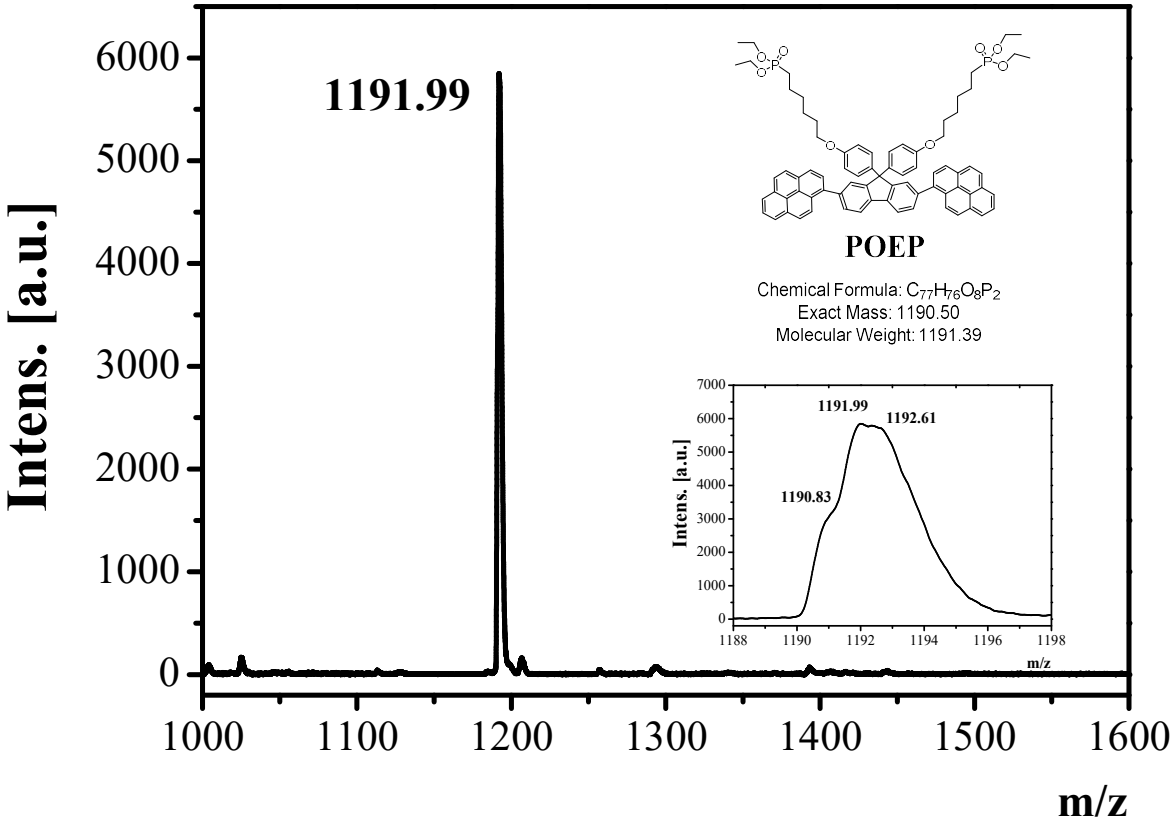

Fig. S9 MALDI-TOF mass spectra for POEP.

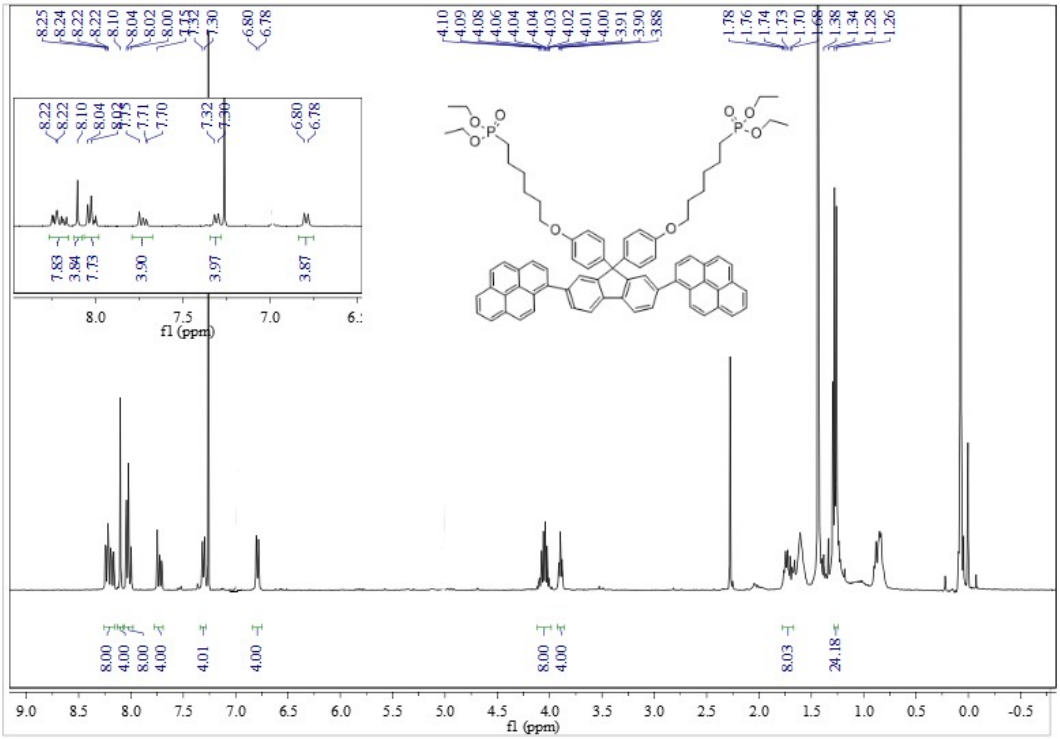

Fig. S10 ^{1}H NMR spectra of POEP in $CDCl_3$.

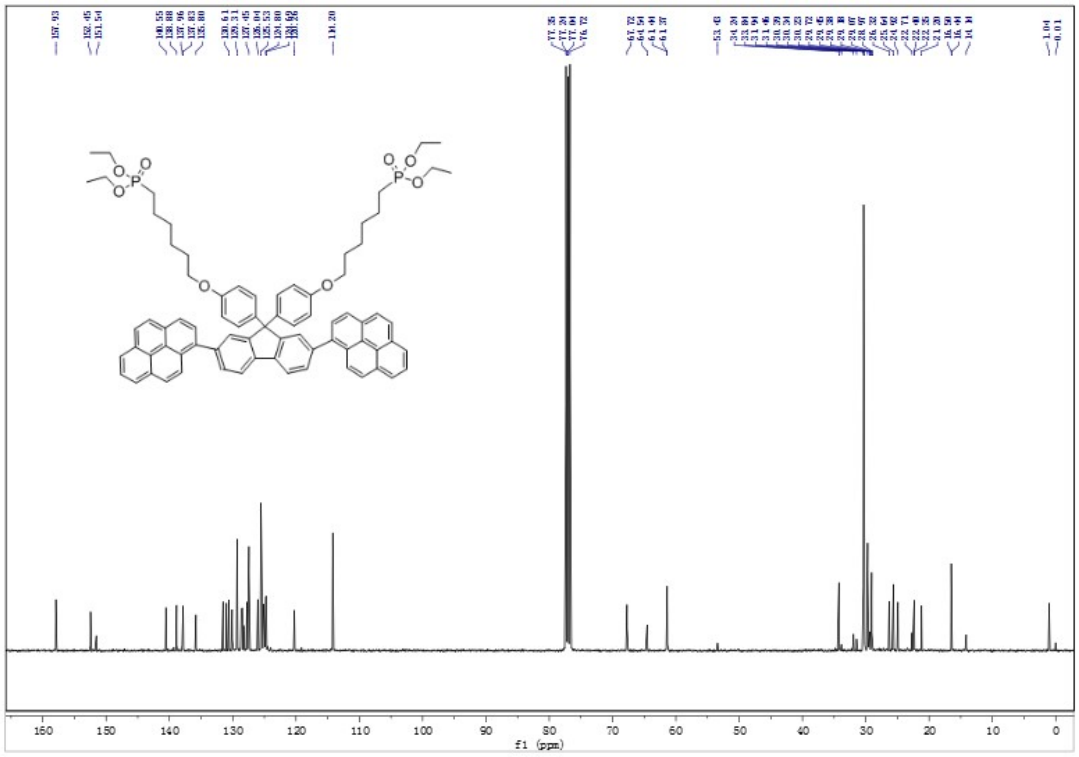

Fig. S11 ^{13}C NMR spectra of POEP in $CDCl_3$.