Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting information for

Ion induced cycle opening of a diarylethene and its application on visual detection of Cu^{2+} and Hg^{2+} and keypad lock

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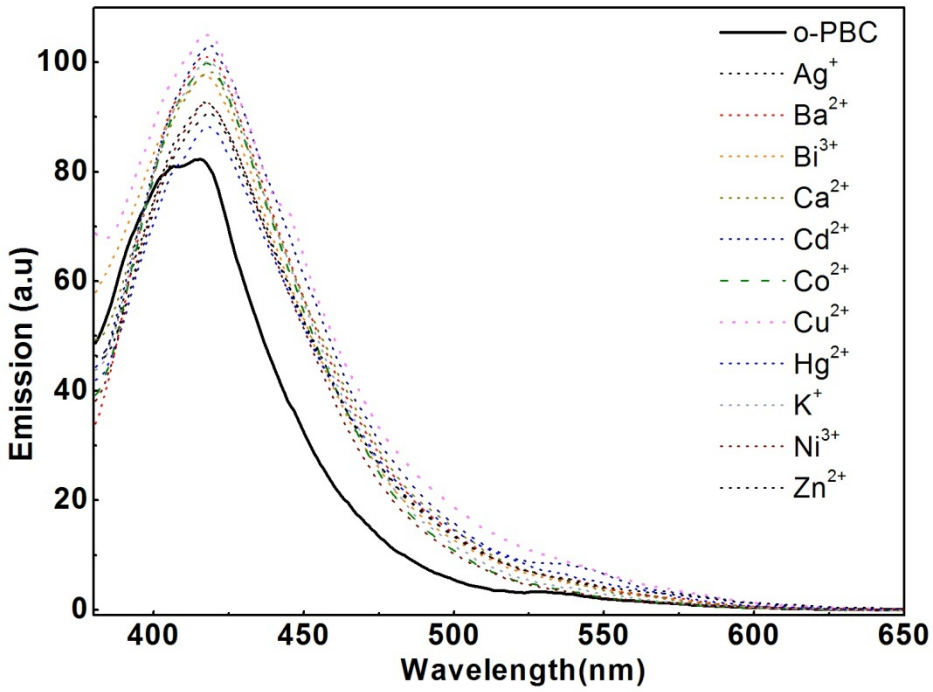

Fig. S 1 Fluorescence spectra of **o-PBC** solutions added different metal ions.

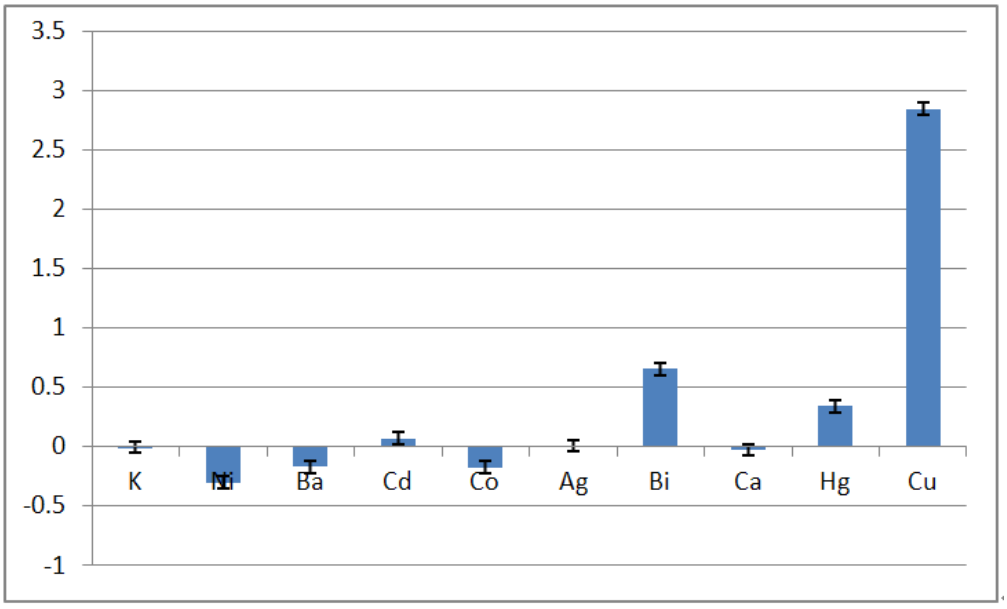

Fig. S 2 Emission intensity changes of **PBC** acetonitrile solution (1.0×10^{-5} mol L^{-1}) at 452 nm in PSS in the presence of respective metal ions (20 equiv.) at room temperature. F0: initial emission intensity of **PBC**; F: emission intensity of **PBC** in the presence of metal ions(20 equiv.).

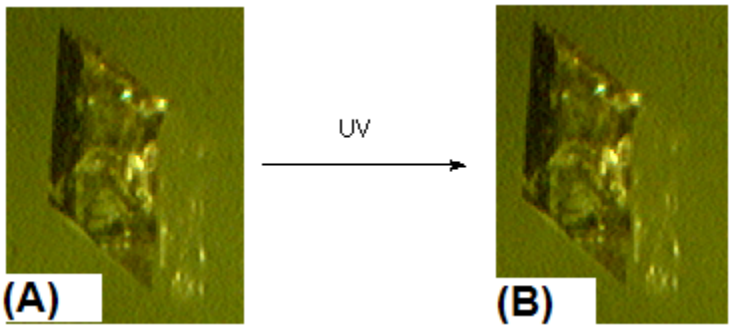

Fig. S 3 Color change of crystal **PBC** before(A) and after(B)UV light irradiation.

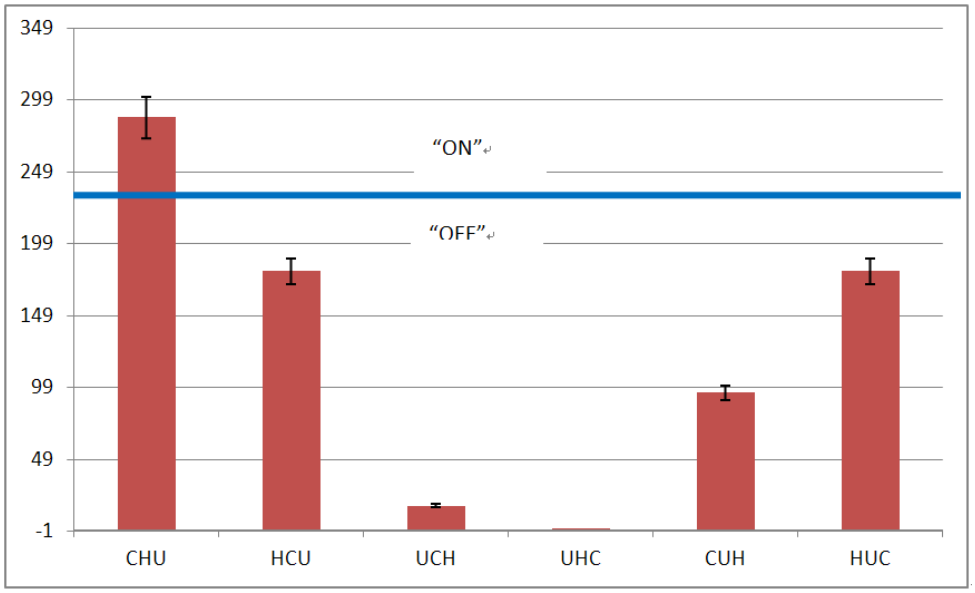

Fig. S 4 Fluorescence emission output of compound **PBC** corresponding to six possible input combinations at 480 nm

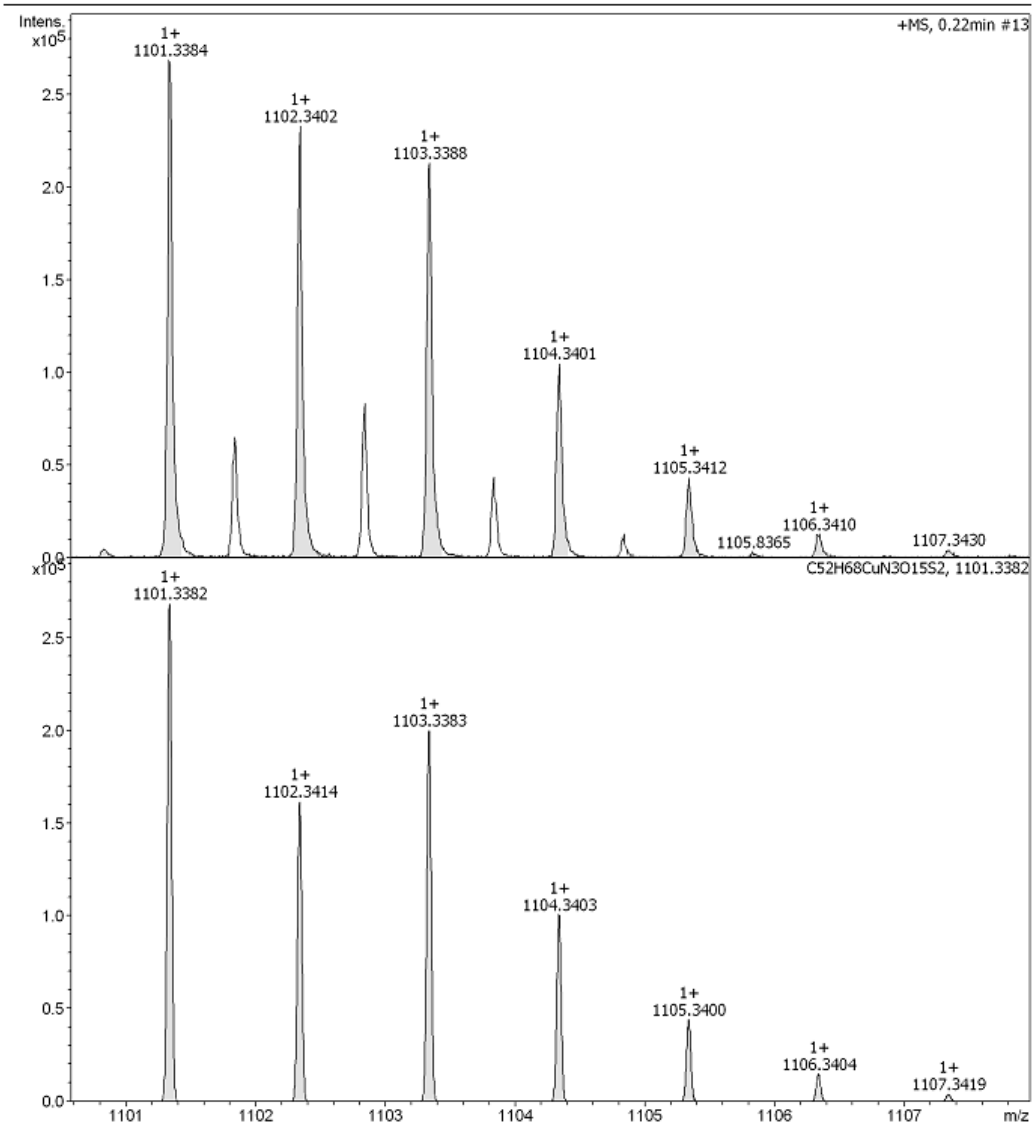

Fig. S 5 Generic display report of HRMS for **PBC-Cu-NO_3**

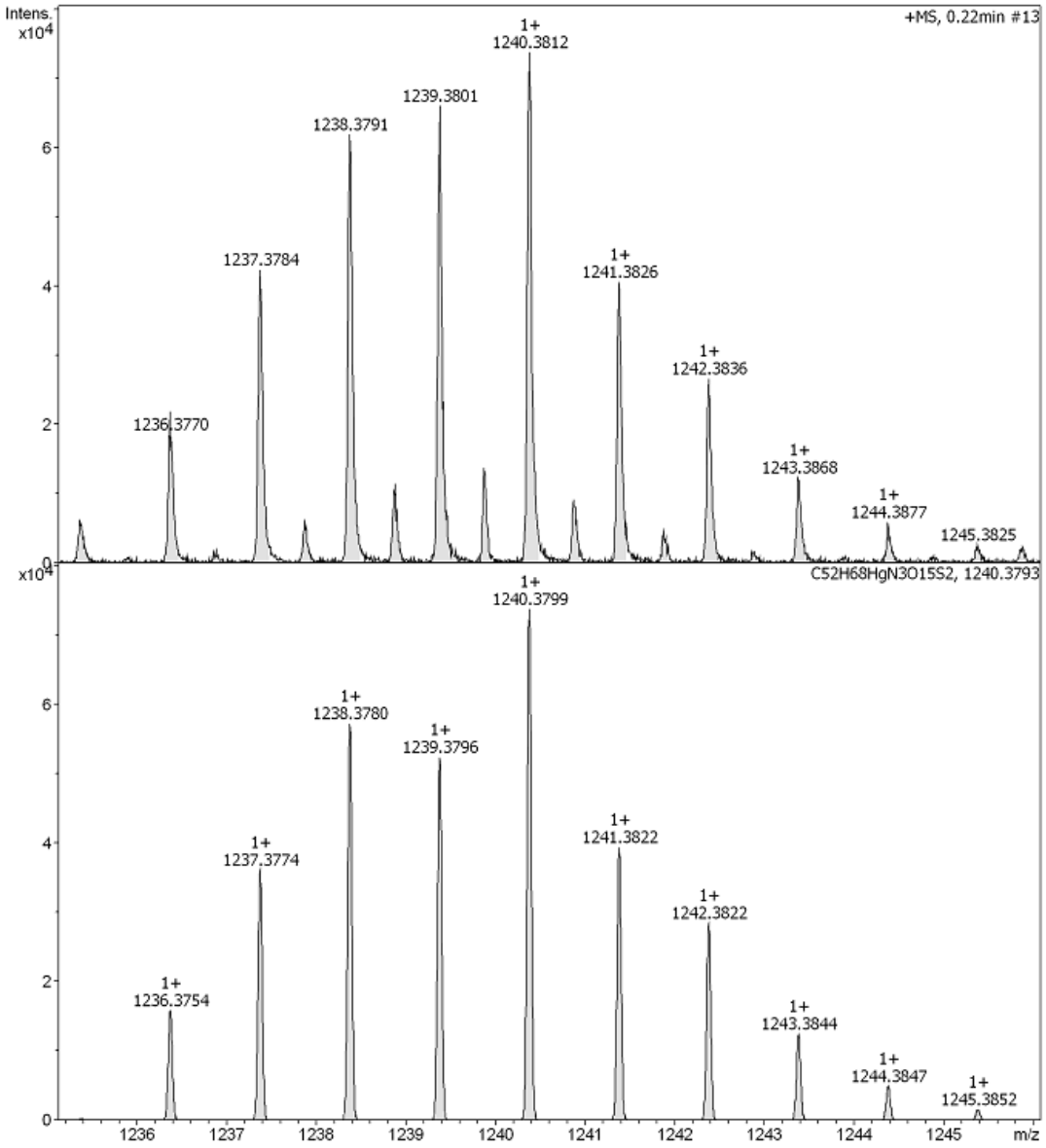

Fig. S 6 Generic display report of HRMS for **PBC-Hg-NO_3**

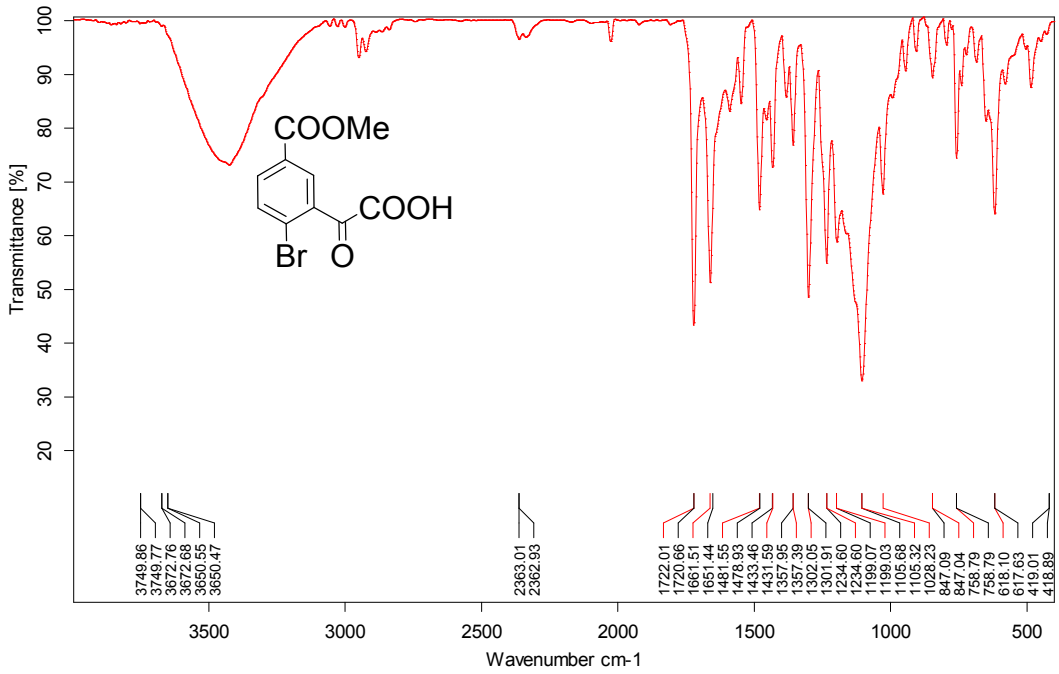

Fig. S 7 IR spectrum of 2-bromo-5-(methoxycarbonyl)benzoic acid(**2**)

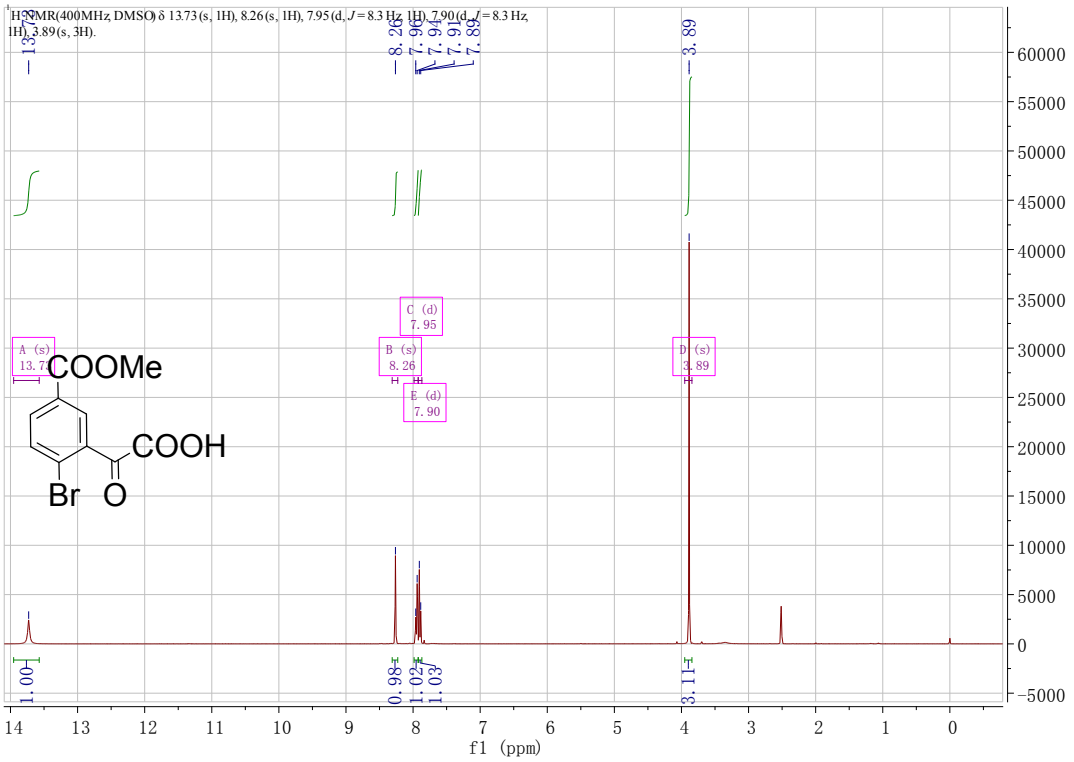

Fig. S 8 [1]H NMR spectrum of 2-bromo-5-(methoxycarbonyl)benzoic acid(**2**)

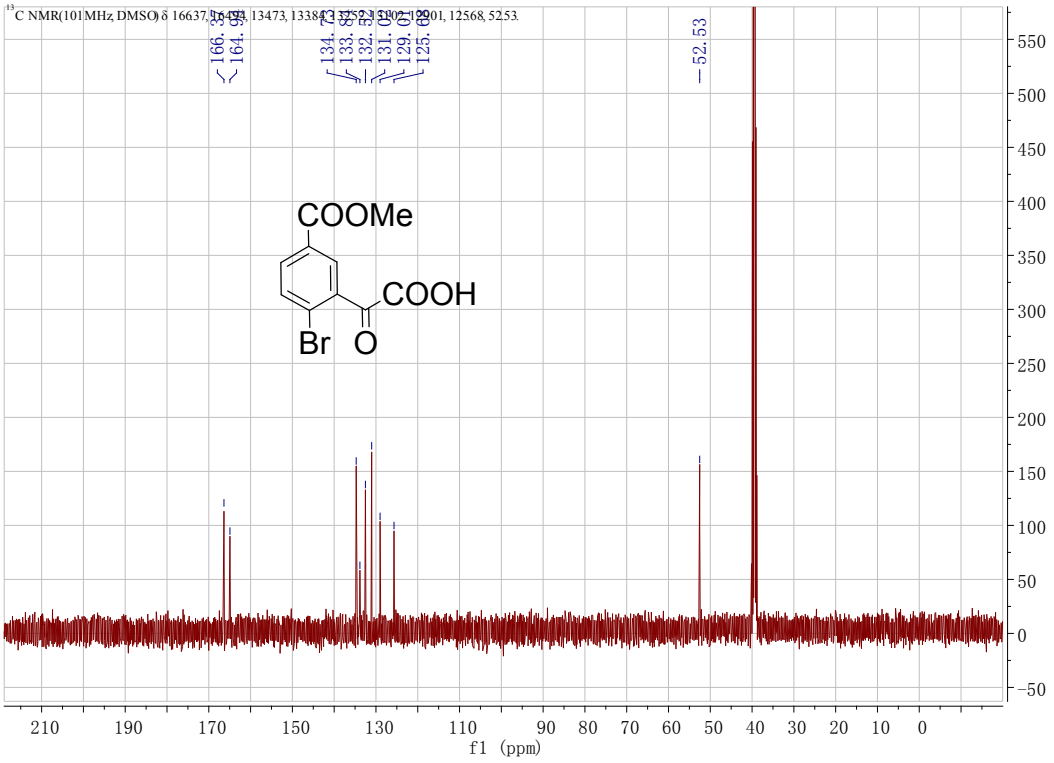

Fig. S 9 [13]C NMR spectrum of 2-bromo-5-(methoxycarbonyl)benzoic acid(**2**)

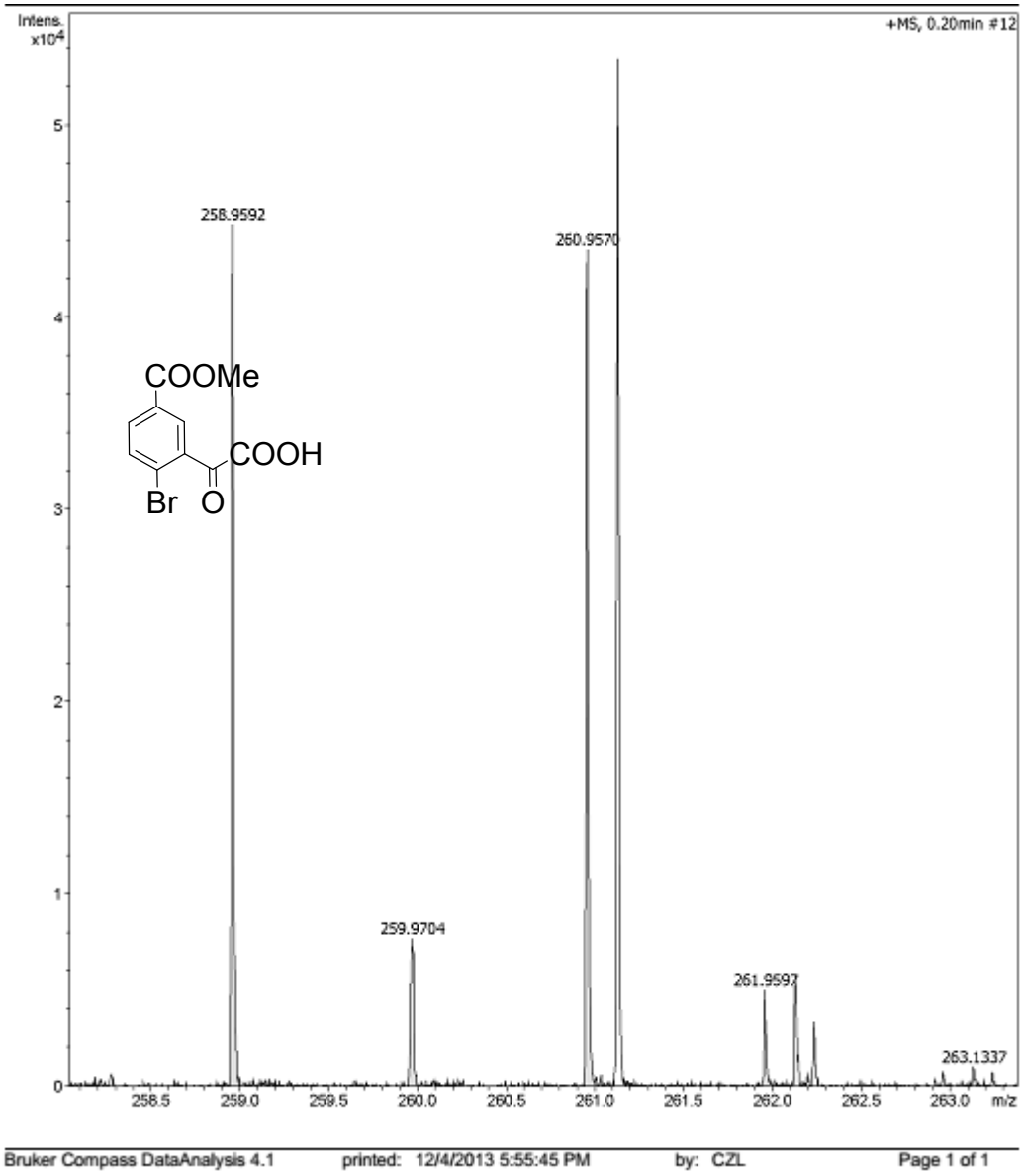

Fig. S 10 HRMS spectrum of 2-bromo-5-(methoxycarbonyl)benzoic acid(**2**)

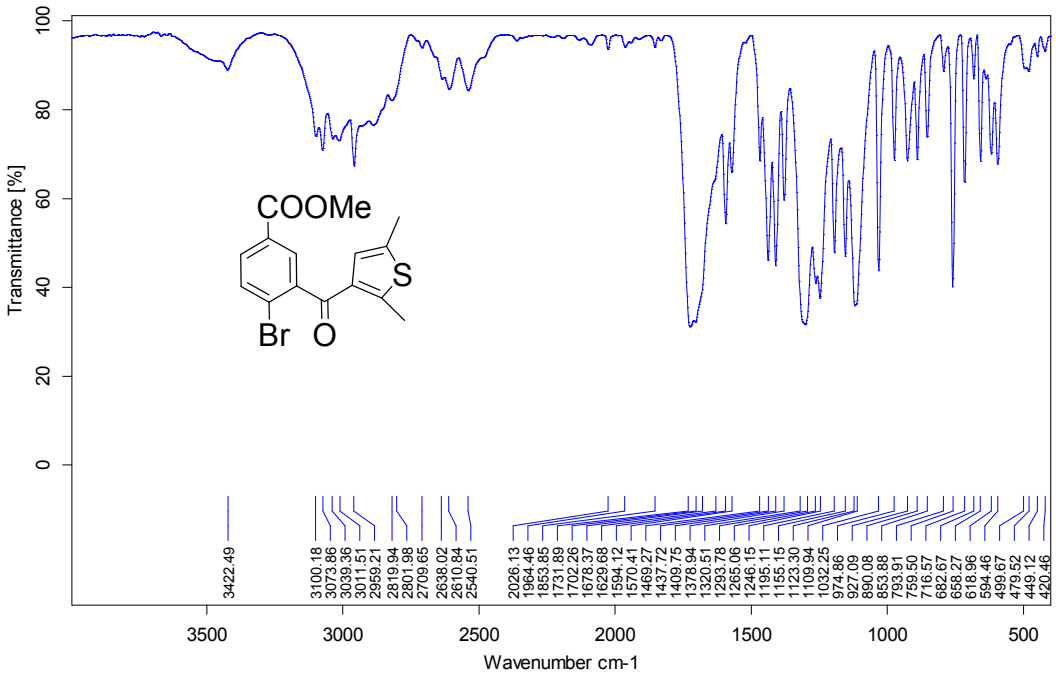

Fig. S 11 IR spectrum of methyl 4-bromo-3-(2,5-dimethylthiophene-3-carbonyl)benzoate(**3**)

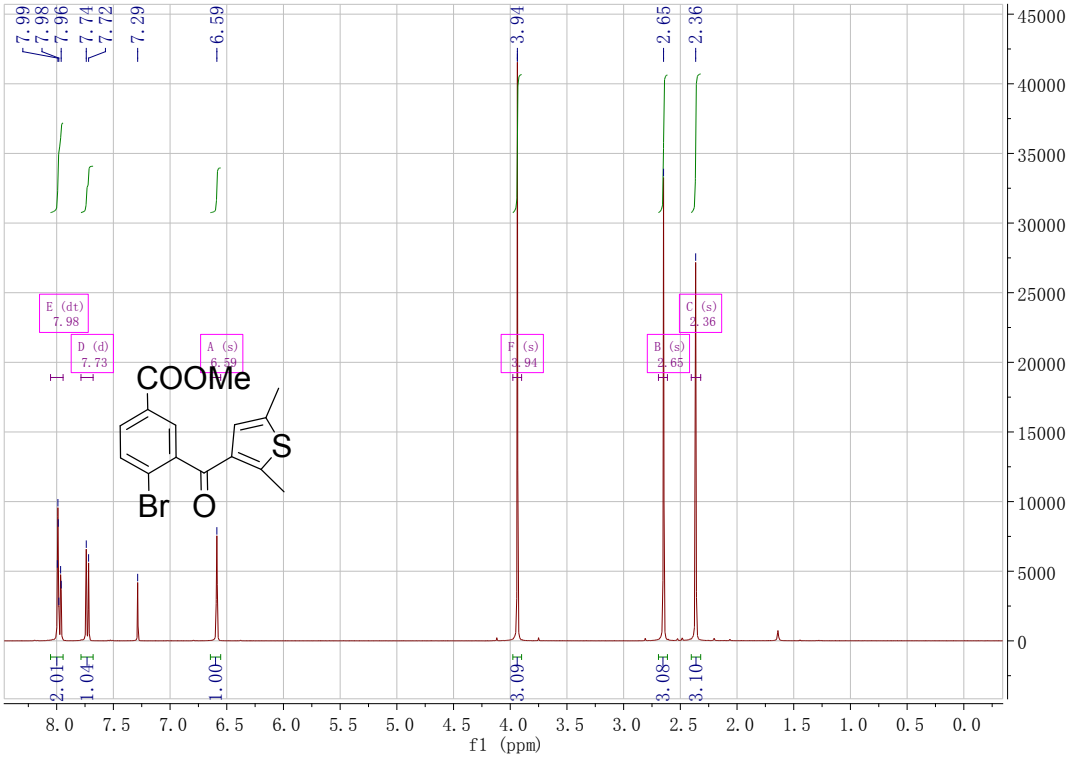

Fig. S 12 ^{1}H NMR spectrum of methyl 4-bromo-3-(2,5-dimethylthiophene-3-carbonyl)benzoate(**3**)

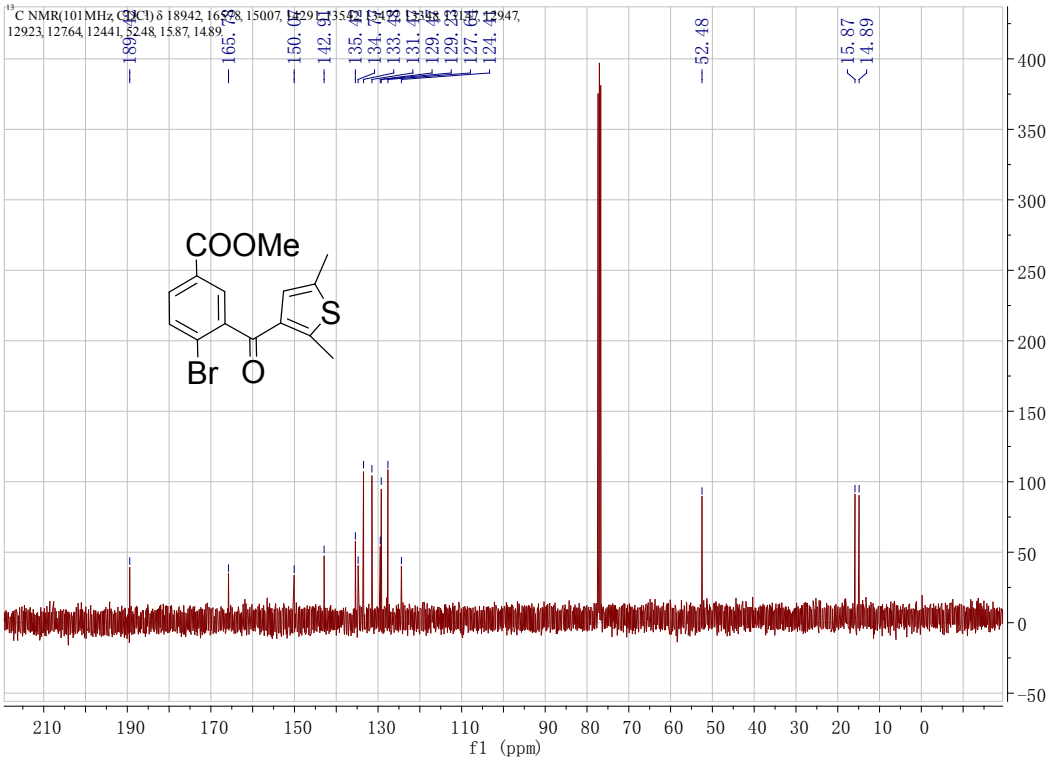

Fig. S 13 ^{13}C NMR spectrum of methyl 4-bromo-3-(2,5-dimethylthiophene-3-carbonyl)benzoate(**3**)

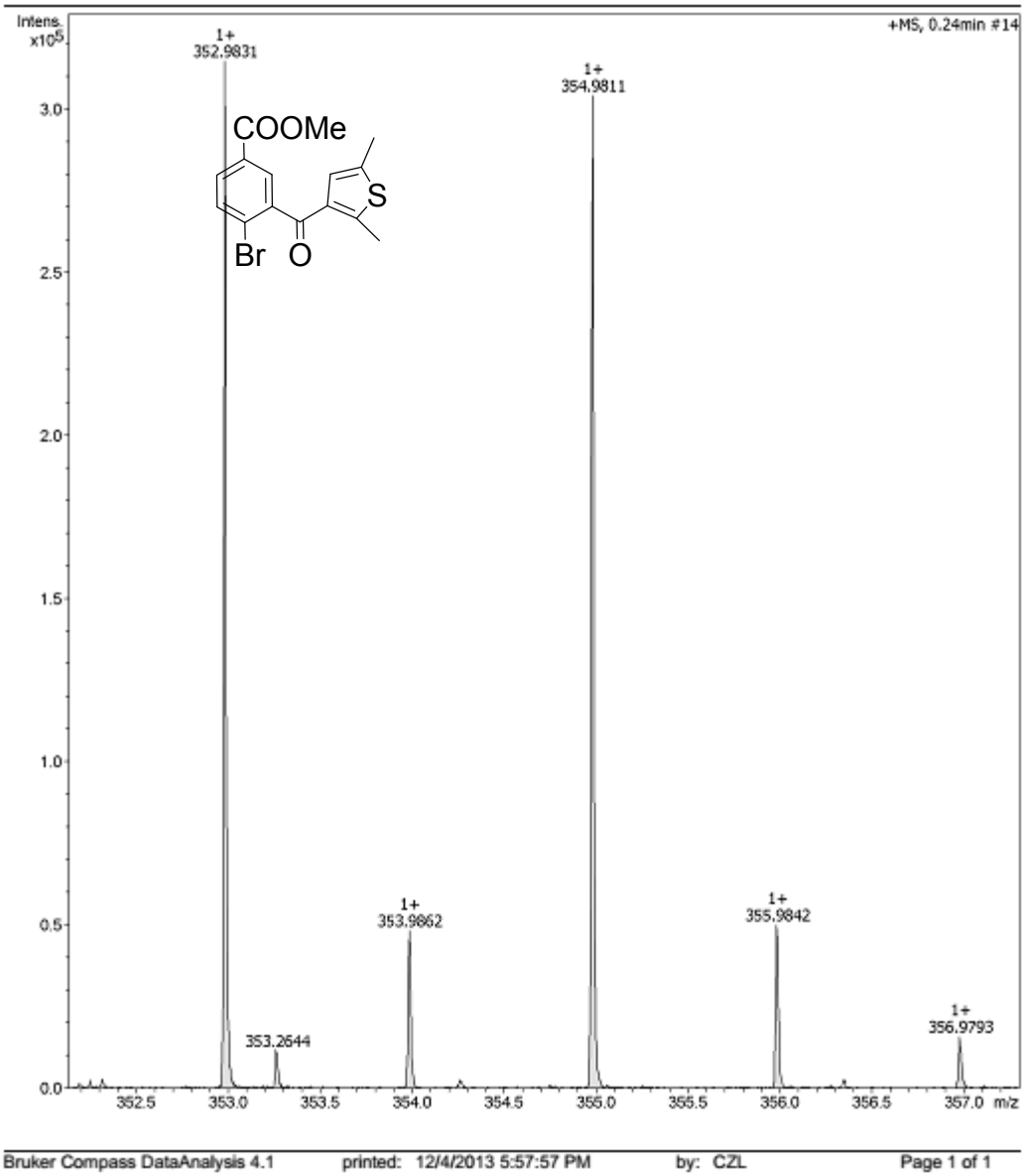

Fig. S 14 MS spectrum of methyl 4-bromo-3-(2,5-dimethylthiophene-3-carbonyl)benzoate(**3**)

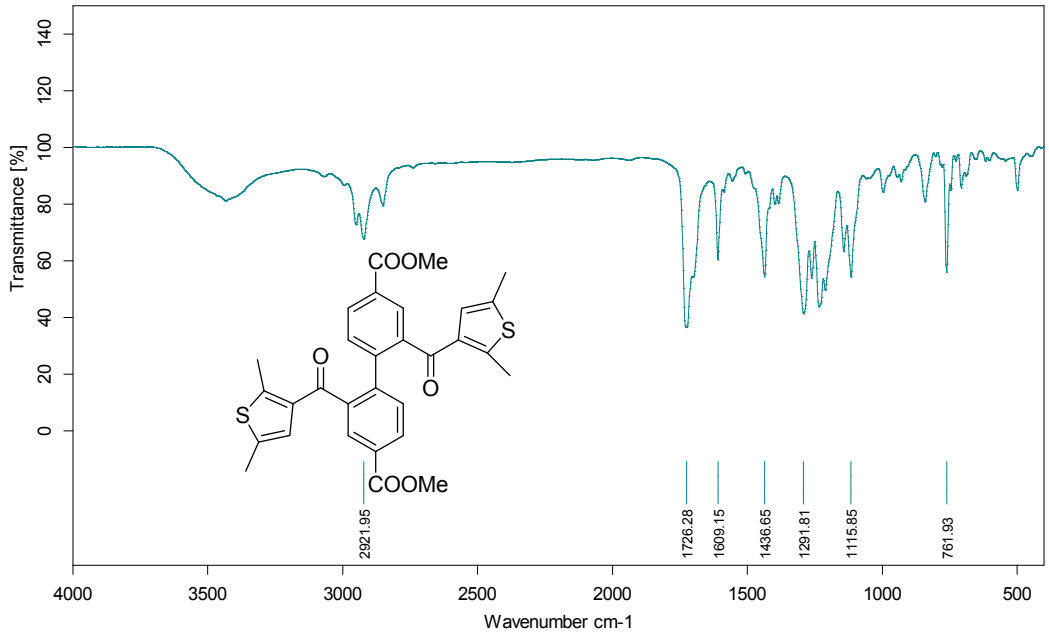

Fig. S15 IR spectrum of 2,2'-bis(2,5-dimethylthiophene-3-carbonyl) biphenyl-4,4'-dicarboxylate(**4**).

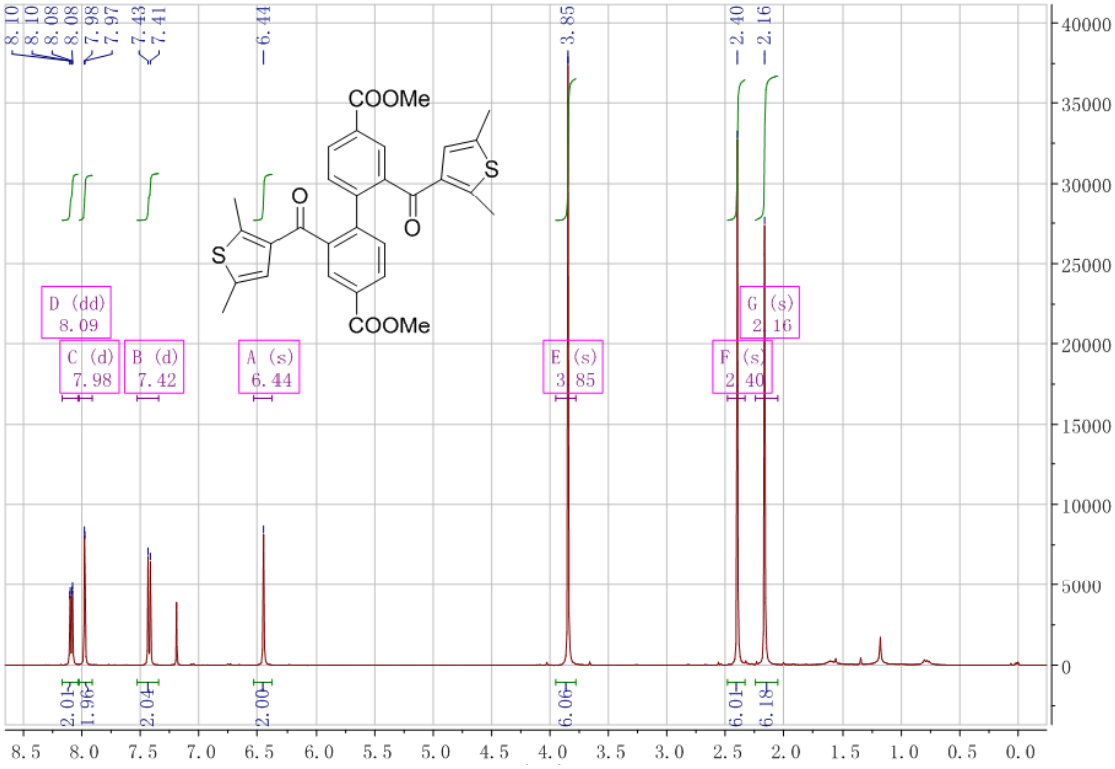

Fig. S16 ^{1}H NMR spectrum of 2,2'-bis(2,5-dimethylthiophene-3-carbonyl) biphenyl-4,4'-dicarboxylate(**4**).

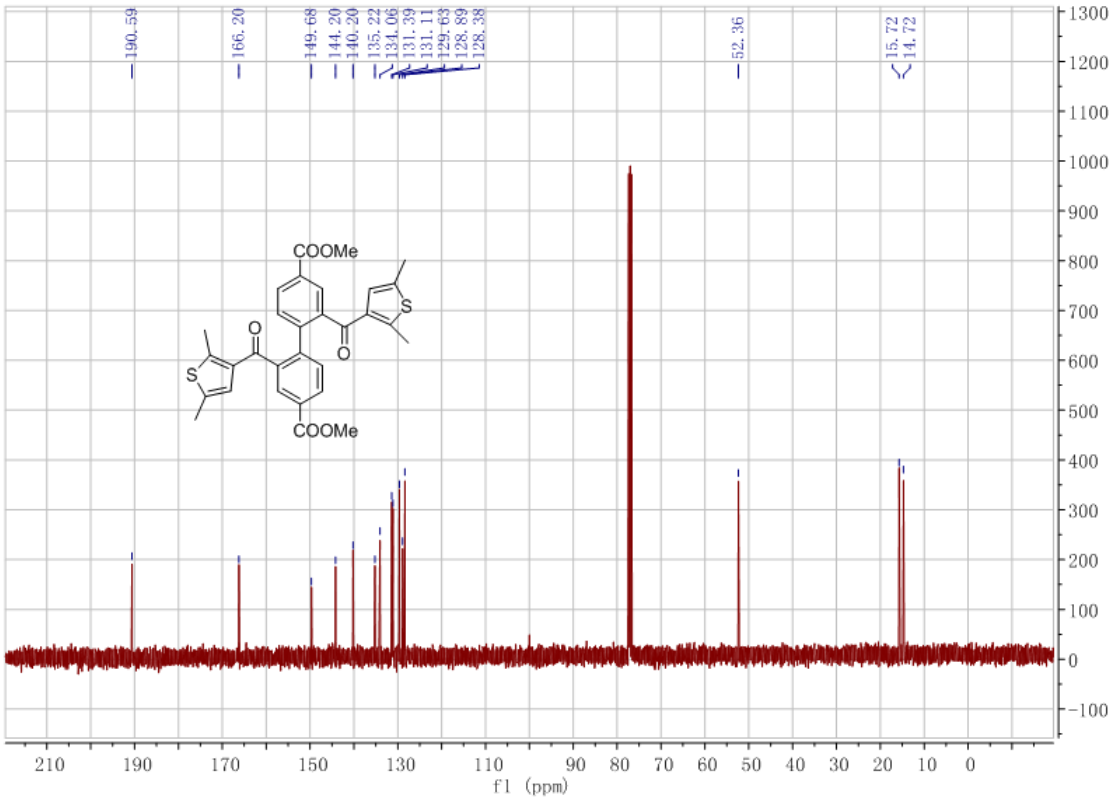

Fig. S17 ^{13}C NMR spectrum of 2,2'-bis(2,5-dimethylthiophene-3-carbonyl) biphenyl-4,4'-dicarboxylate(**4**).

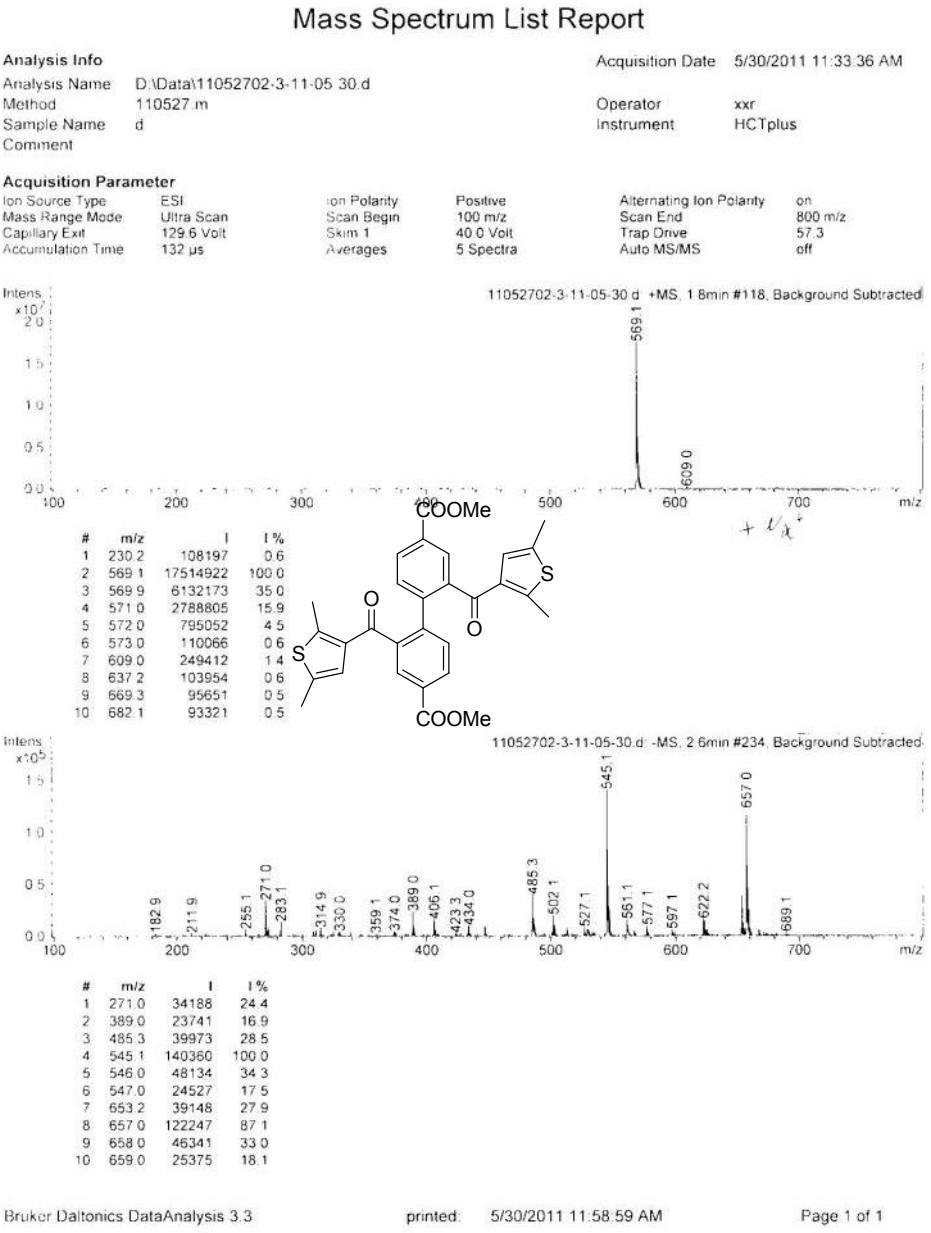

Fig. S18 Mass spectrum of 2,2'-bis(2,5-dimethylthiophene-3-carbonyl) biphenyl-4,4'-dicarboxylate(**4**).

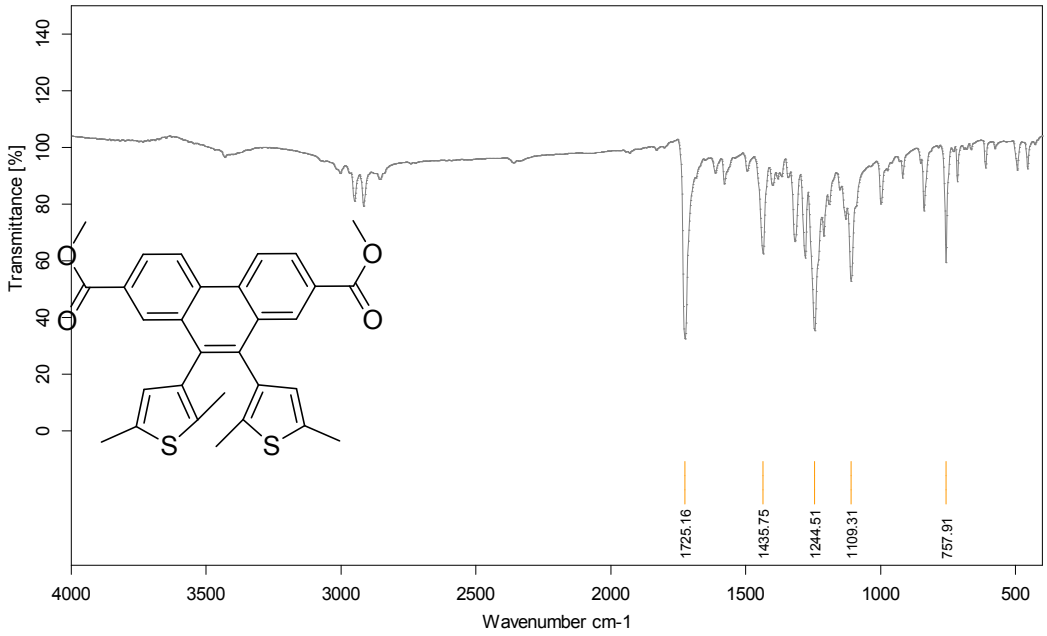

Fig. S19 IR spectrum of dimethyl 9, 10-bis(2,5-dimethylthiophen-3-yl)phenanthrene-2,7-dicarboxylate(**5**).

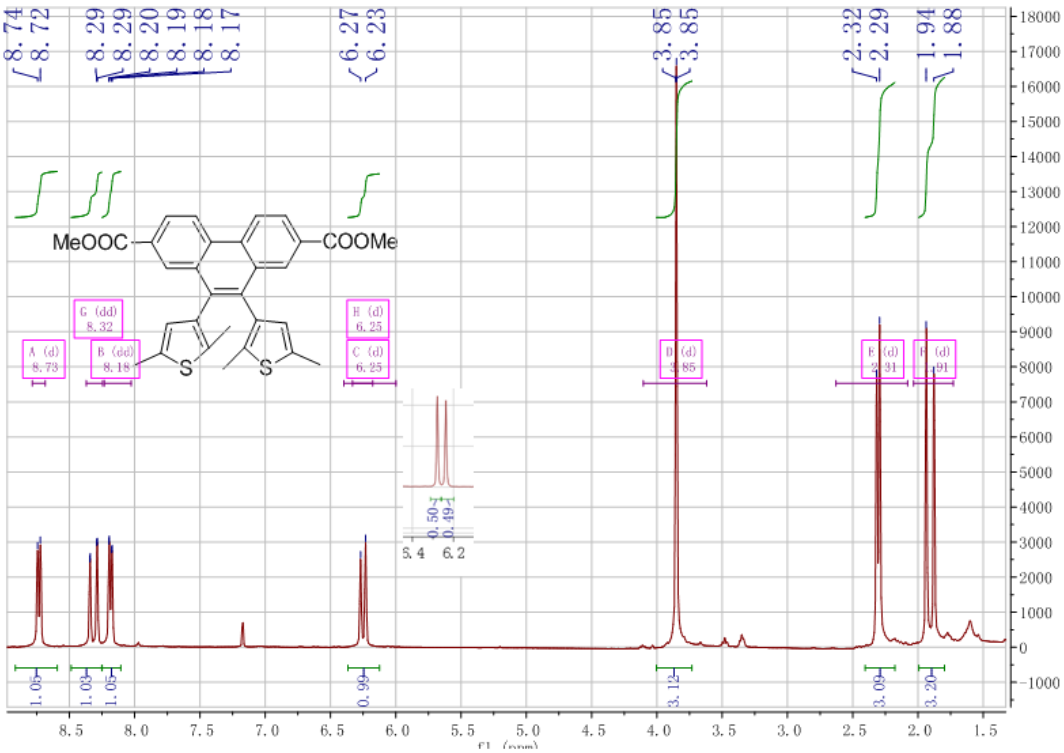

Fig. S20 ^{1}H NMR spectrum of dimethyl 9, 10-bis(2,5-dimethylthiophen-3-yl)phenanthrene-2,7-dicarboxylate(**5**). As the parallel and anti-parallel form couldn't be isolated, the proton of thiophene shows two peaks at 6.2 -6.4 ppm and the integral is almost equal. It indicated that the quantity of parallel form is equal to anti- parallel form.

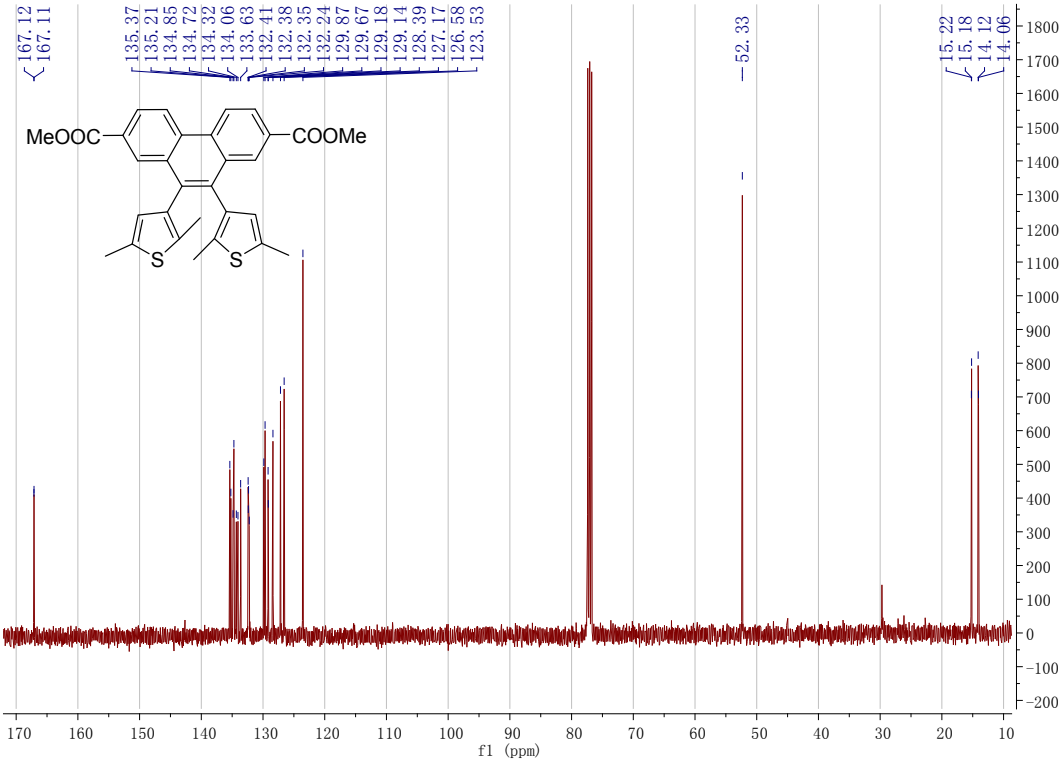

Fig. S21 ^{13}C NMR of dimethyl 9, 10-bis(2,5-dimethylthiophen-3-yl)phenanthrene-2,7-dicarboxylate(**5**).

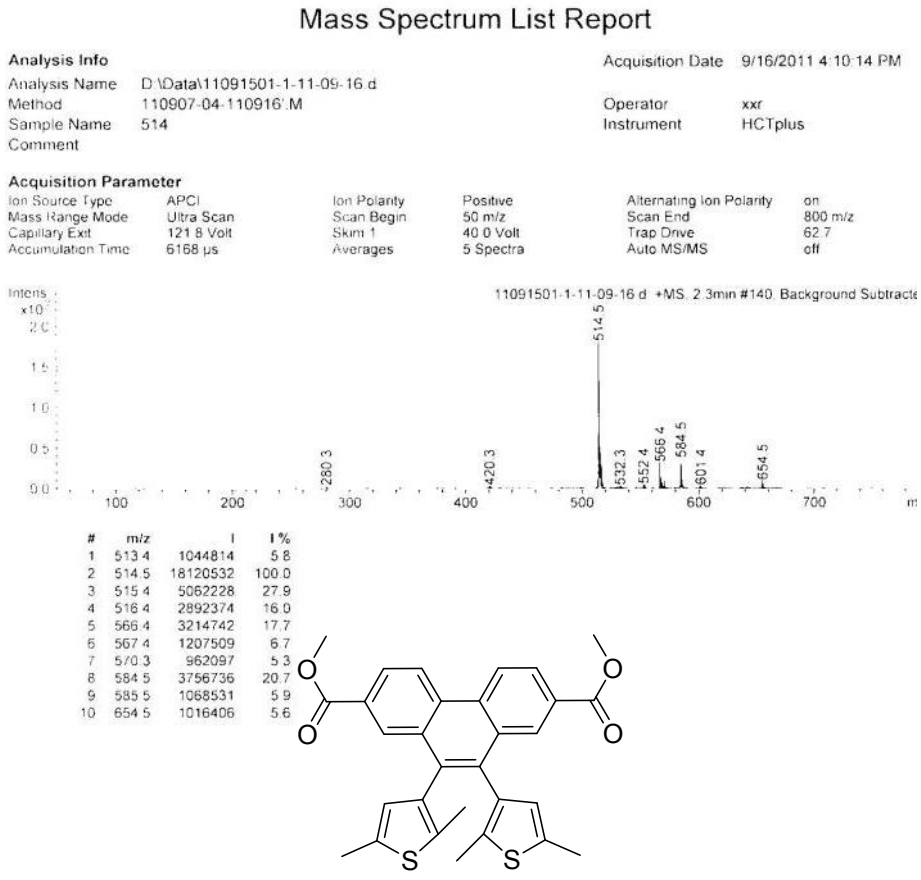

Fig. S22 Mass spectrum of dimethyl 9, 10-bis(2,5-dimethylthiophen-3-yl)phenanthrene-2,7-dicarboxylate(**5**)..

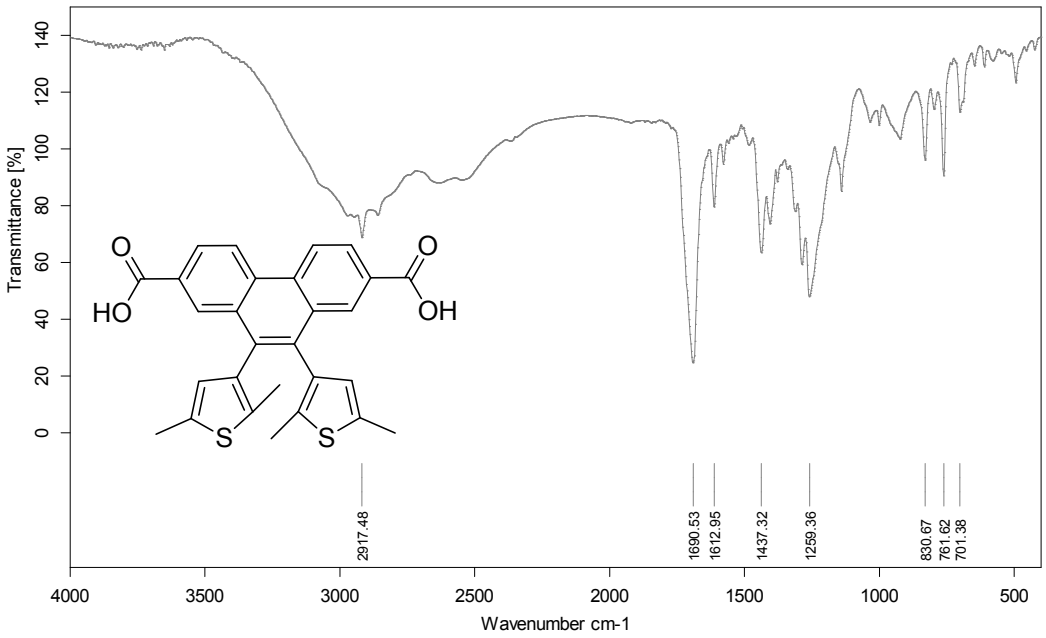

Fig. S23 IR spectrum of 9, 10-bis(2,5-dimethylthiophen-3-yl)phenanthrene-2,7-dicarboxylic acid(**6**).

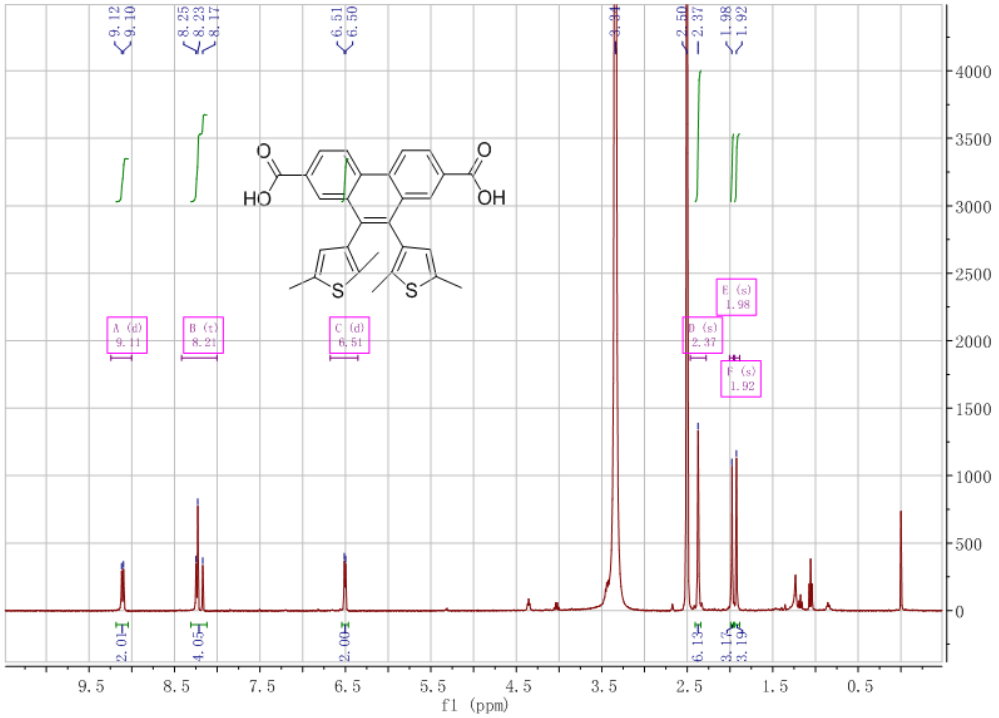

Fig. S24 ^{1}H NMR spectrum of 9, 10-bis(2,5-dimethylthiophen-3-yl)phenanthrene-2,7-dicarboxylic acid(**6**).

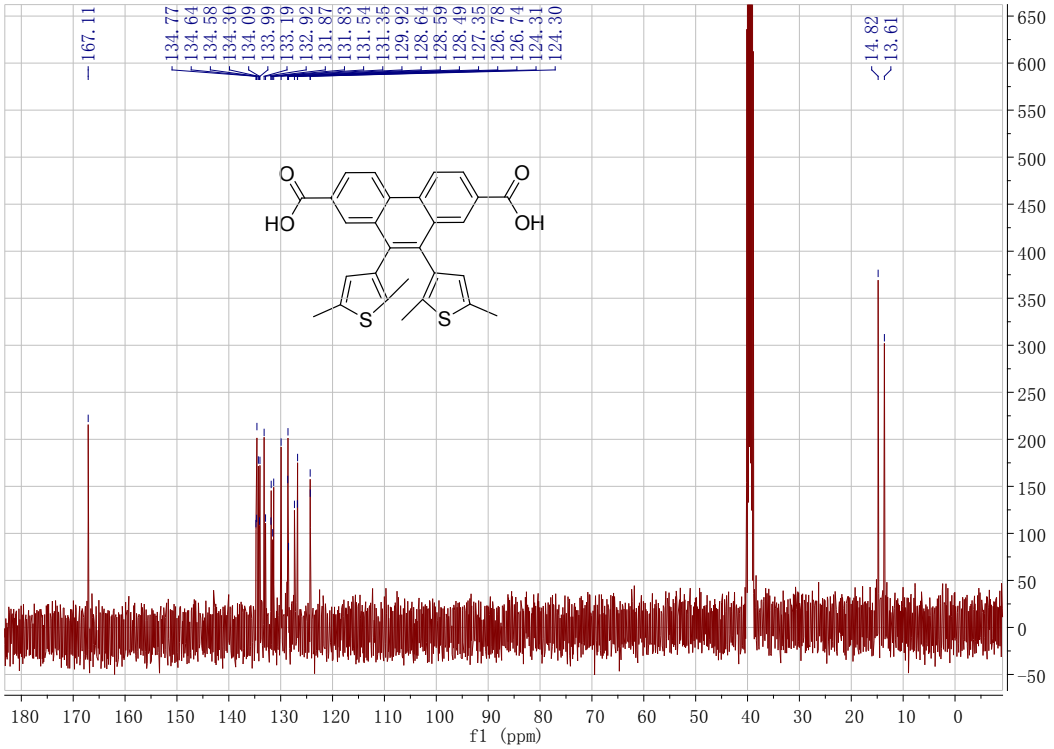

Fig. S25 ^{13}C NMR spectrum of 9, 10-bis(2,5-dimethylthiophen-3-yl)phenanthrene-2,7-dicarboxylic acid(**6**).

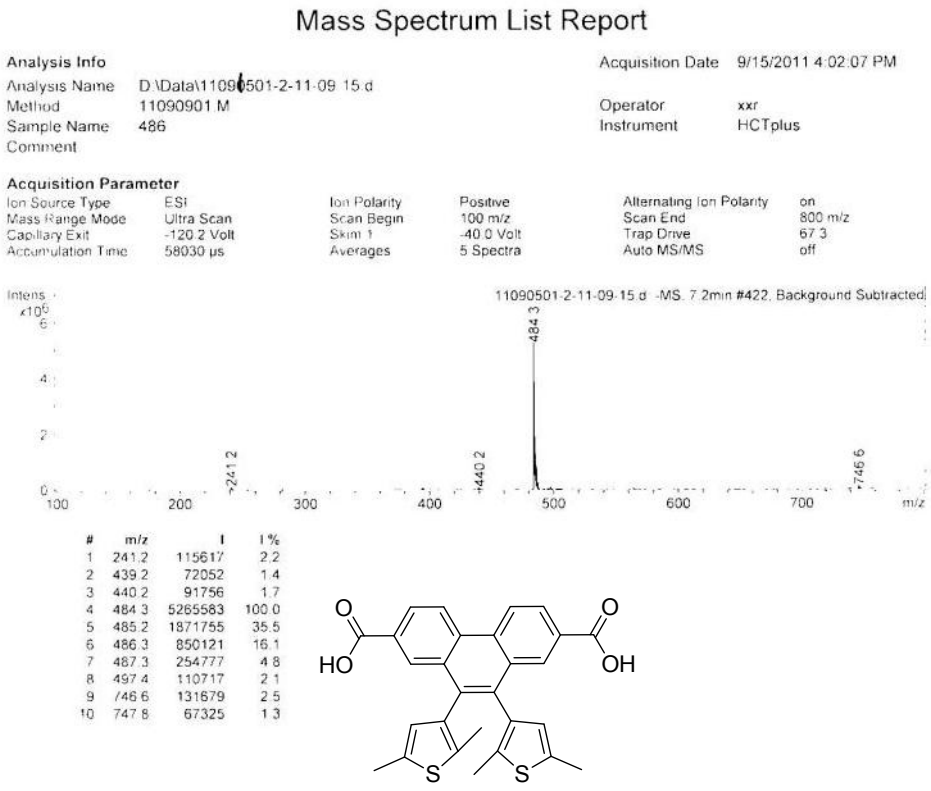

Fig. S26 Mass spectrum of 9, 10-bis(2,5-dimethylthiophen-3-yl)phenanthrene-2,7-dicarboxylic acid(**6**).

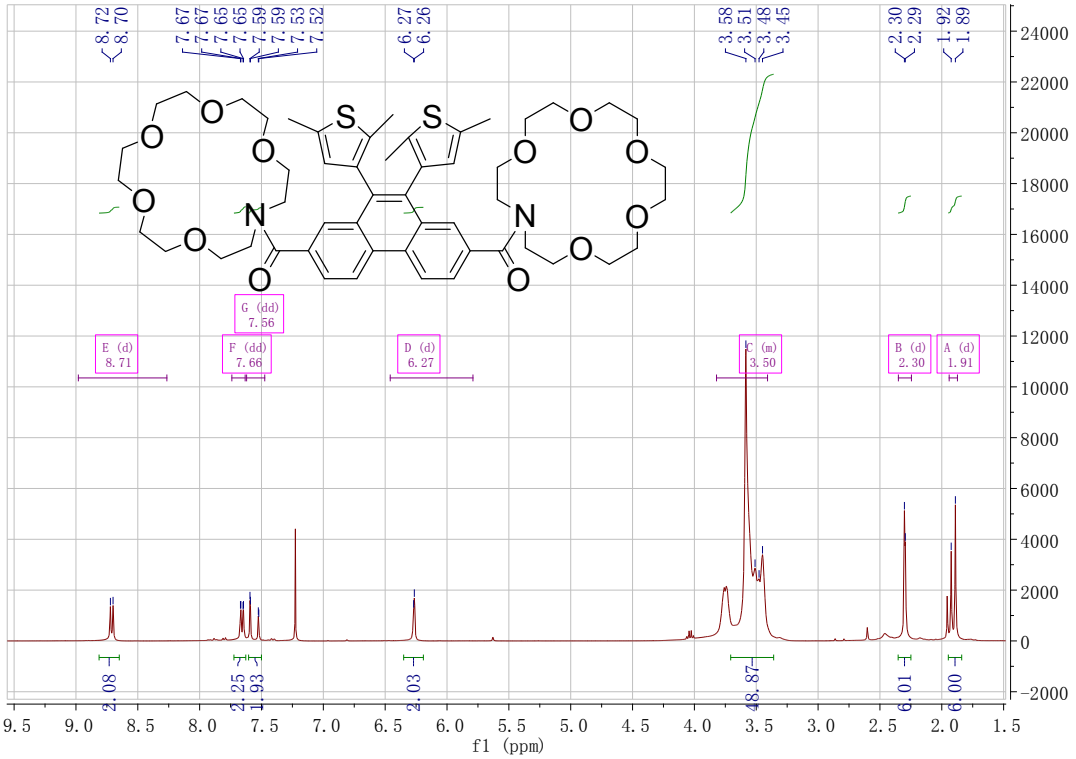

Fig. S 27 ^{1}H NMR spectrum of **PBC**

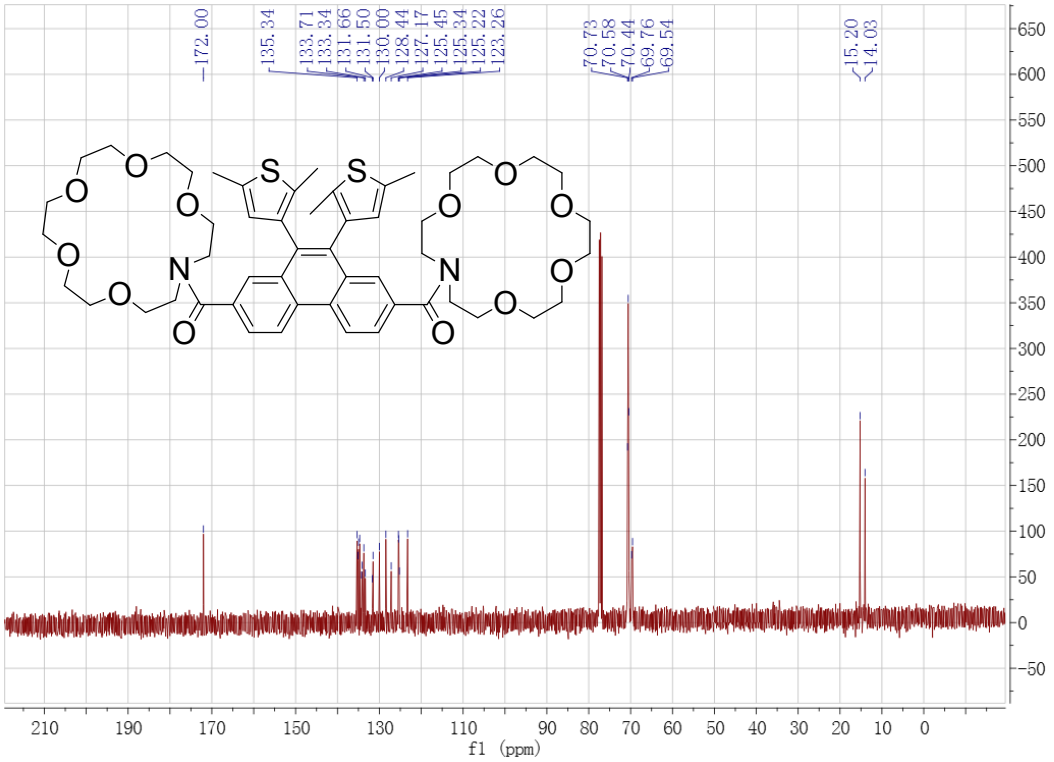

Fig. S 28 ^{13}C NMR spectrum of **PBC**

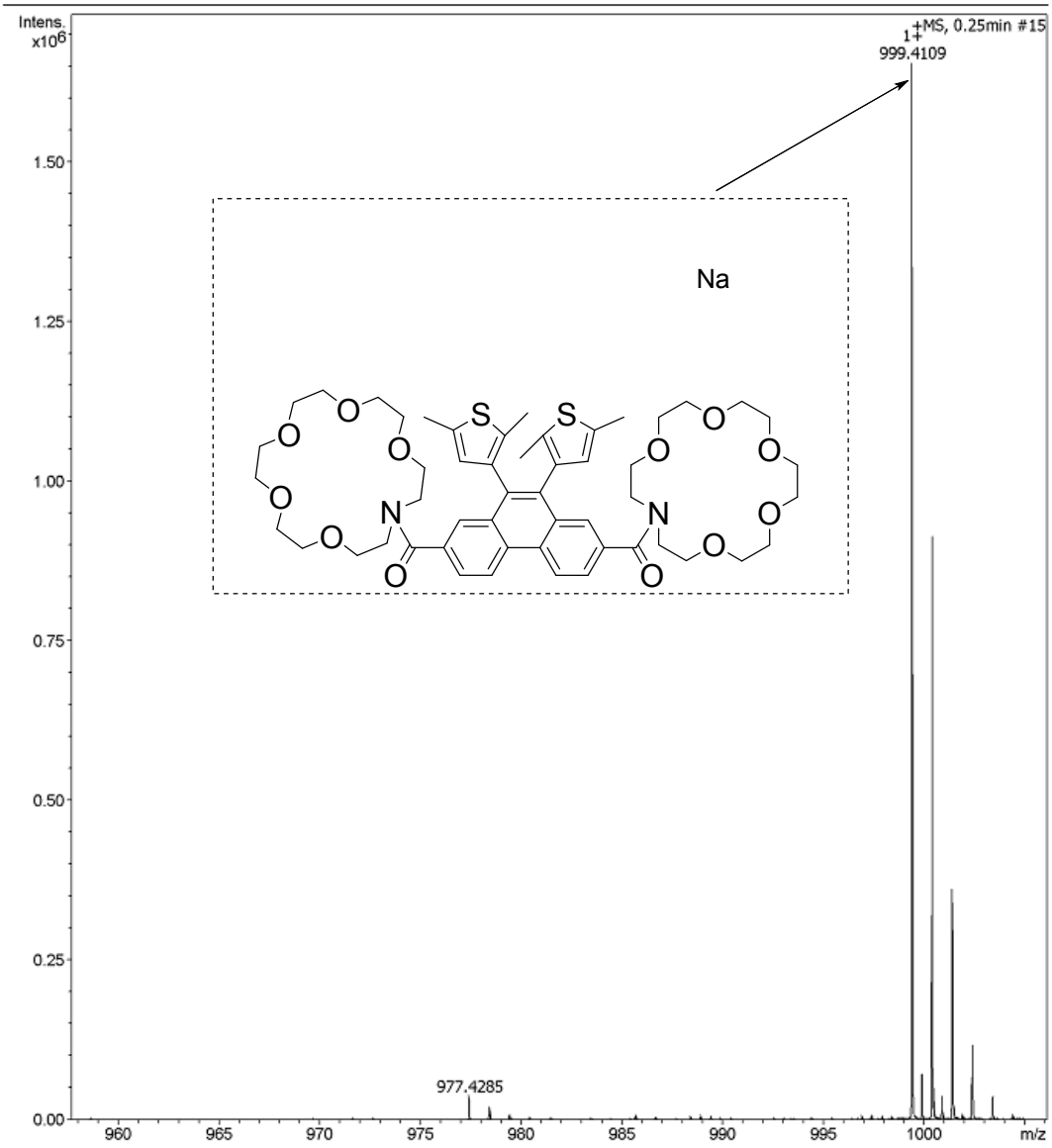

Fig. S 29 HRMS spectrum of **PBC**