

## Supporting Information

# Design, Synthesis, and Structural Characterization of the First Dithienocyclopentacarbazole-Based *n*-Type Organic Semiconductor and its Application in Non-Fullerene Polymer Solar Cells

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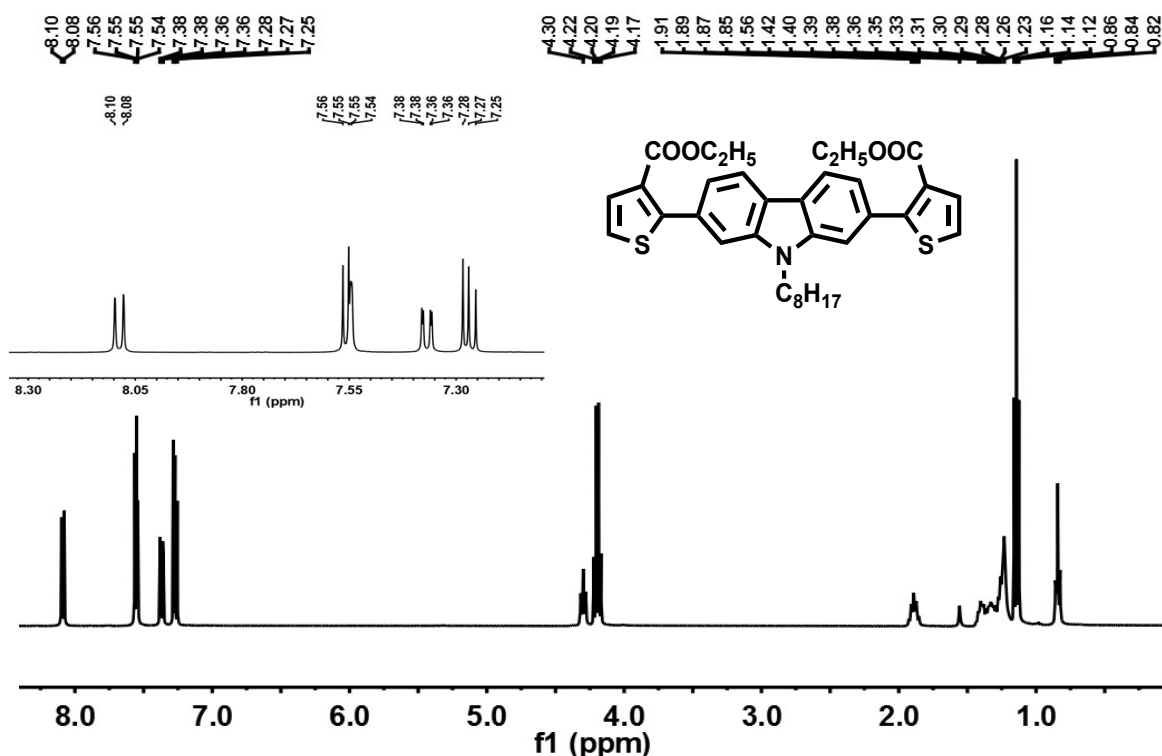


Figure S1. <sup>1</sup>H NMR spectra of compound 2.

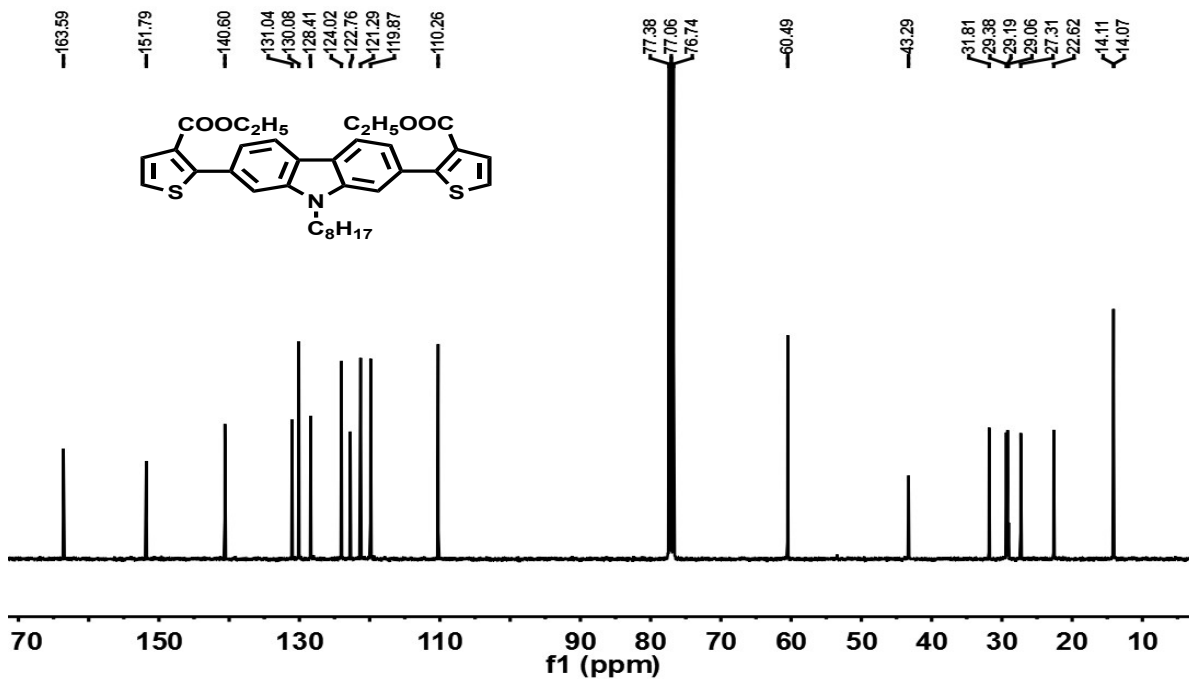


Figure S2.  $^{13}\text{C}$  NMR spectra of compound 2.

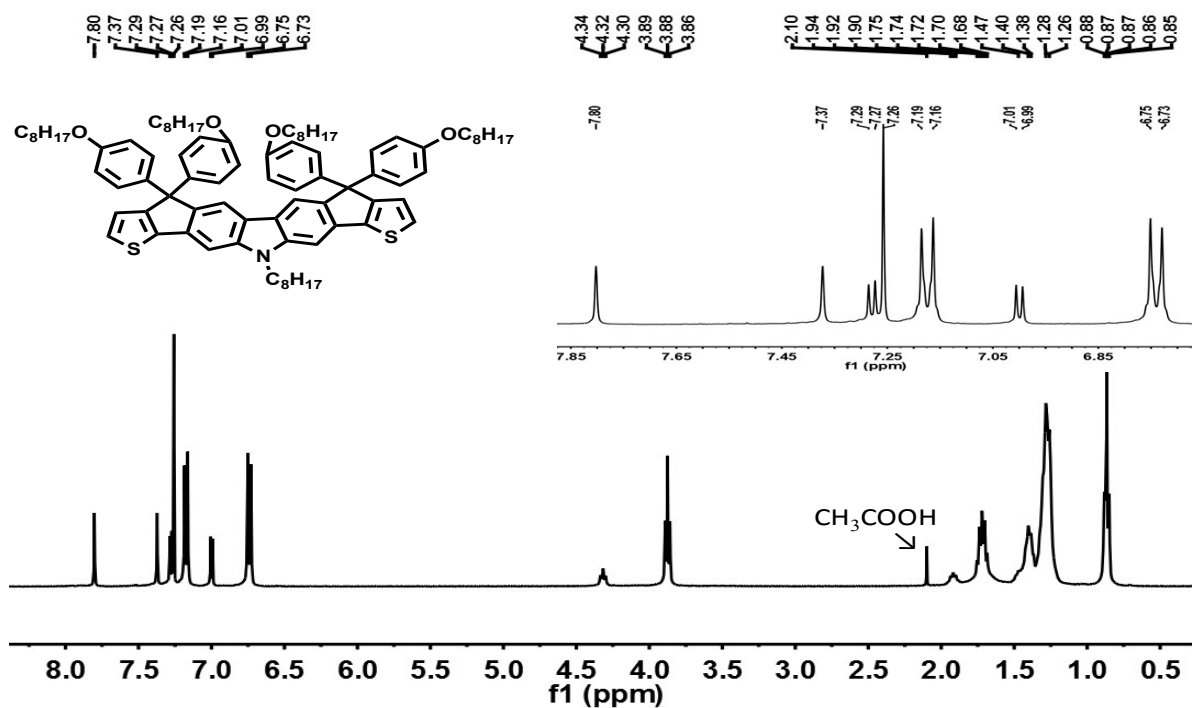


Figure S3.  $^1\text{H}$  NMR spectra of compound DTCC.

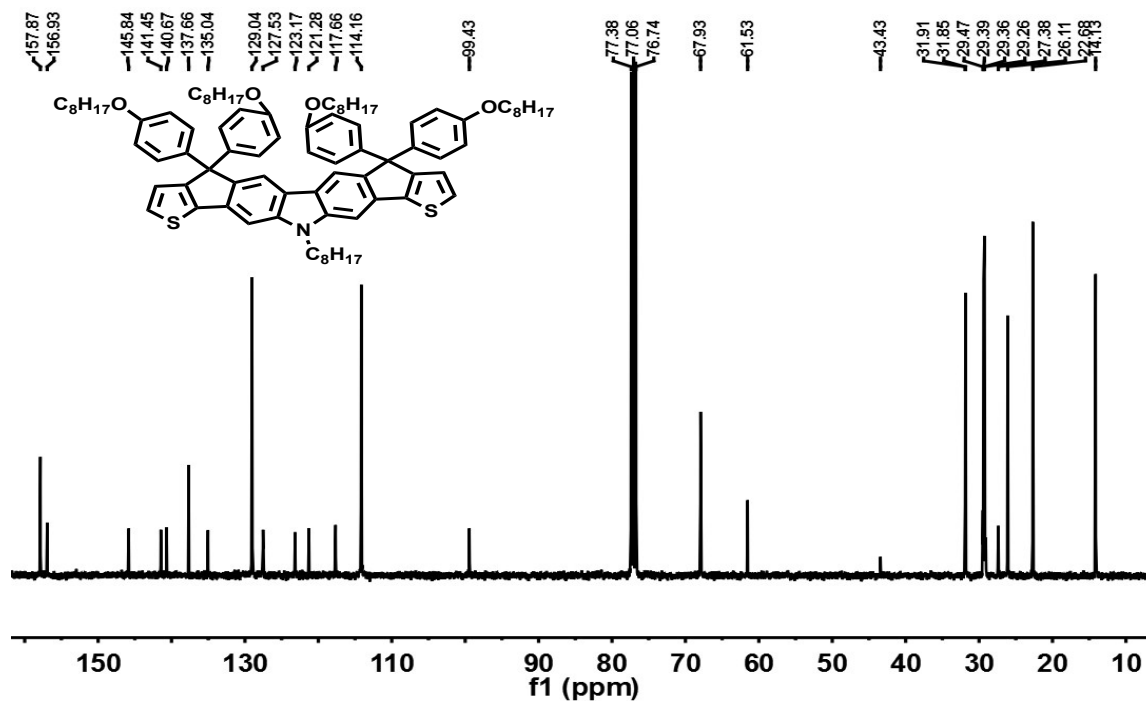


Figure S4. <sup>13</sup>C NMR spectra of compound DTCC.

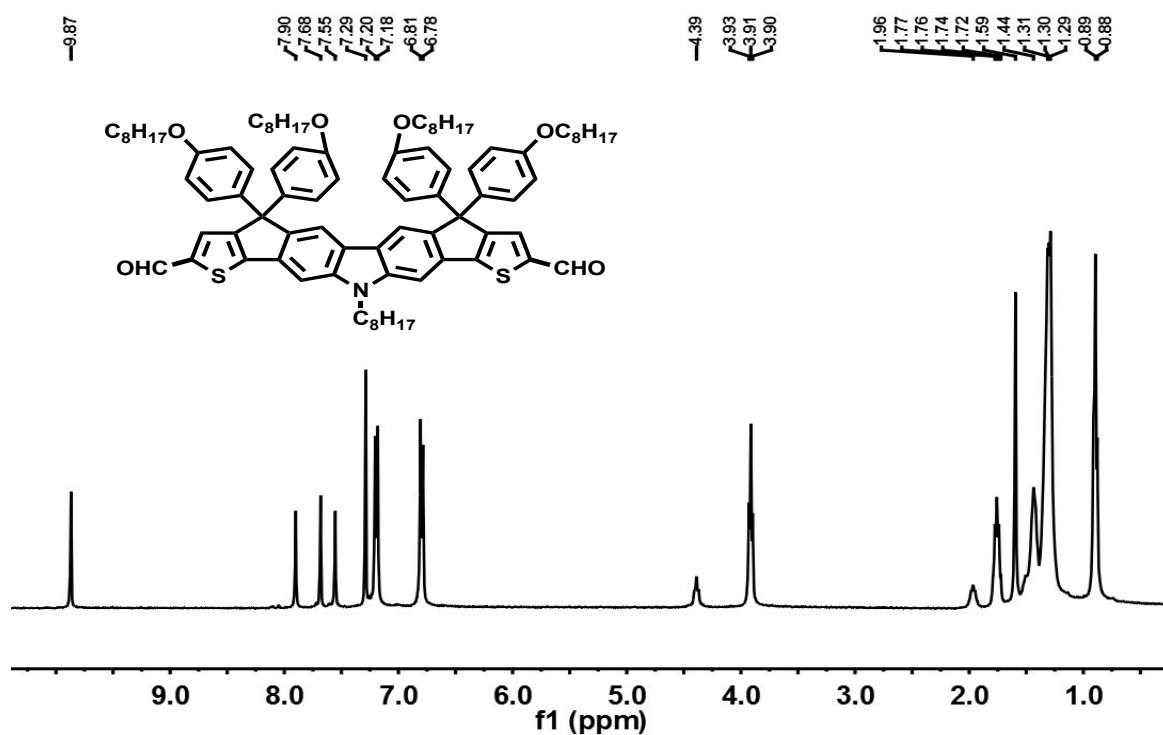


Figure S5. <sup>1</sup>H NMR spectra of compound DTCC-CHO.

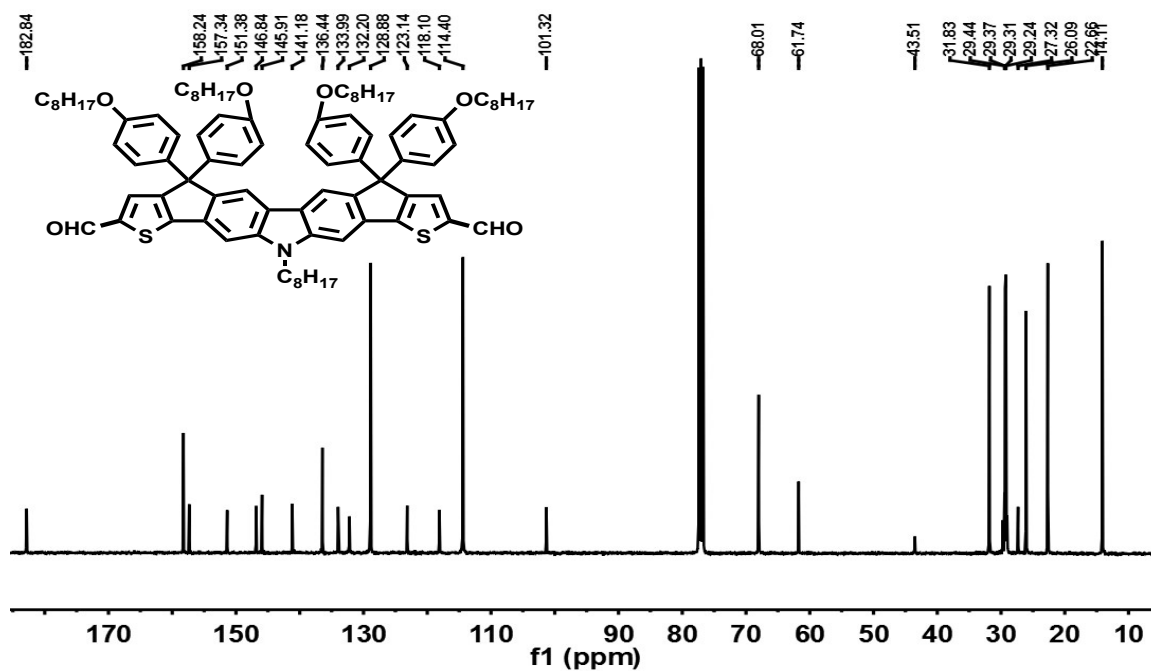


Figure S6.  $^{13}\text{C}$  NMR spectra of compound DTCC-CHO.

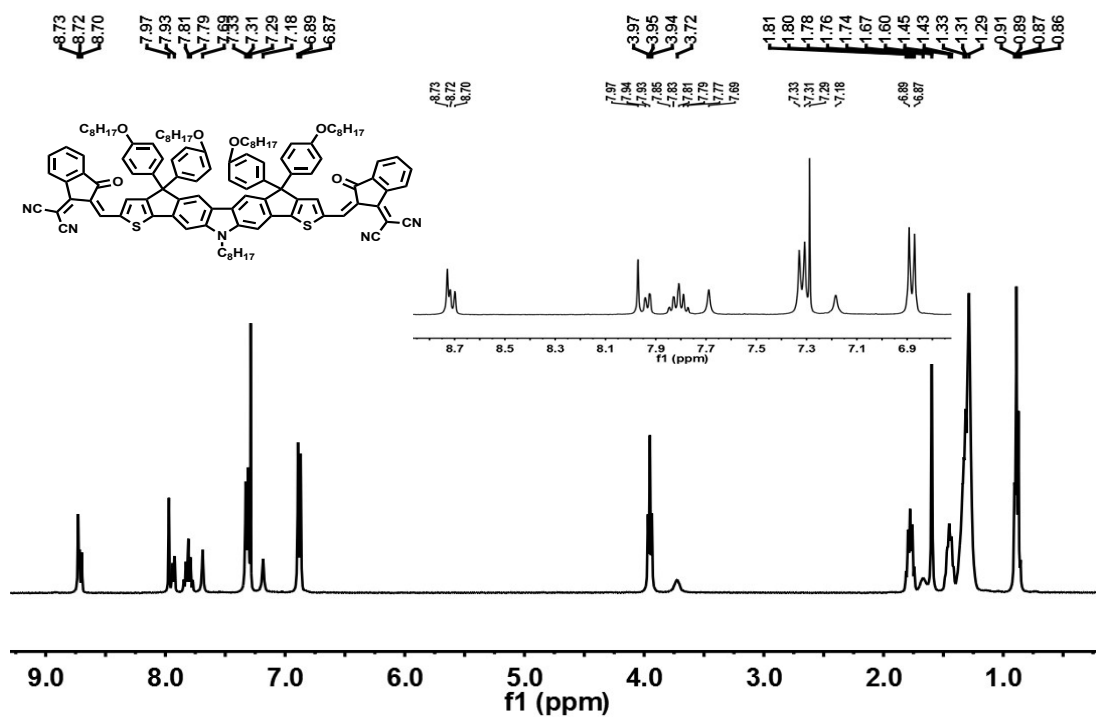


Figure S7.  $^1\text{H}$  NMR spectra of compound DTCC-IC.

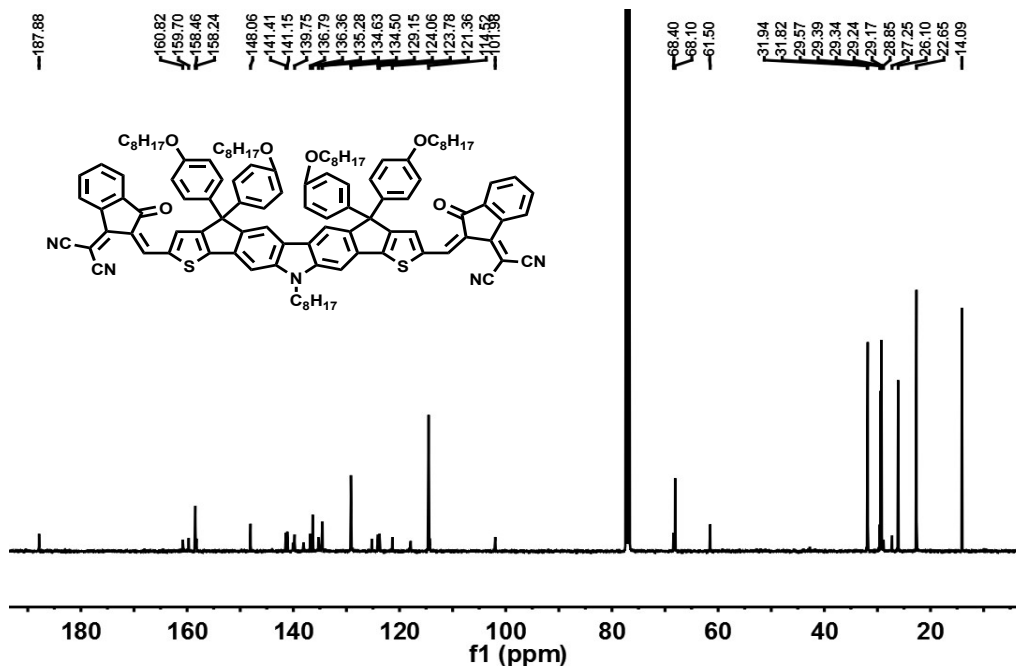


Figure S8.  $^{13}\text{C}$  NMR spectra of compound DTCC-IC.

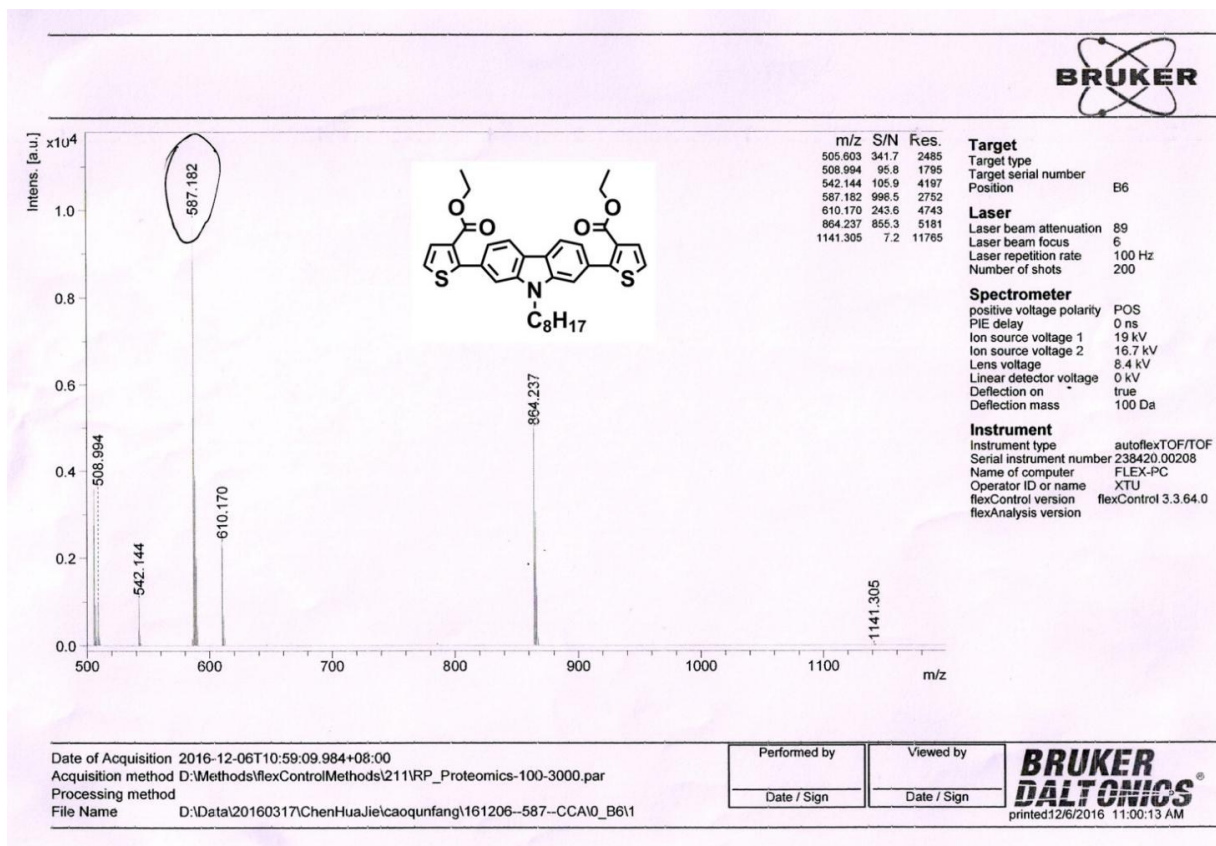
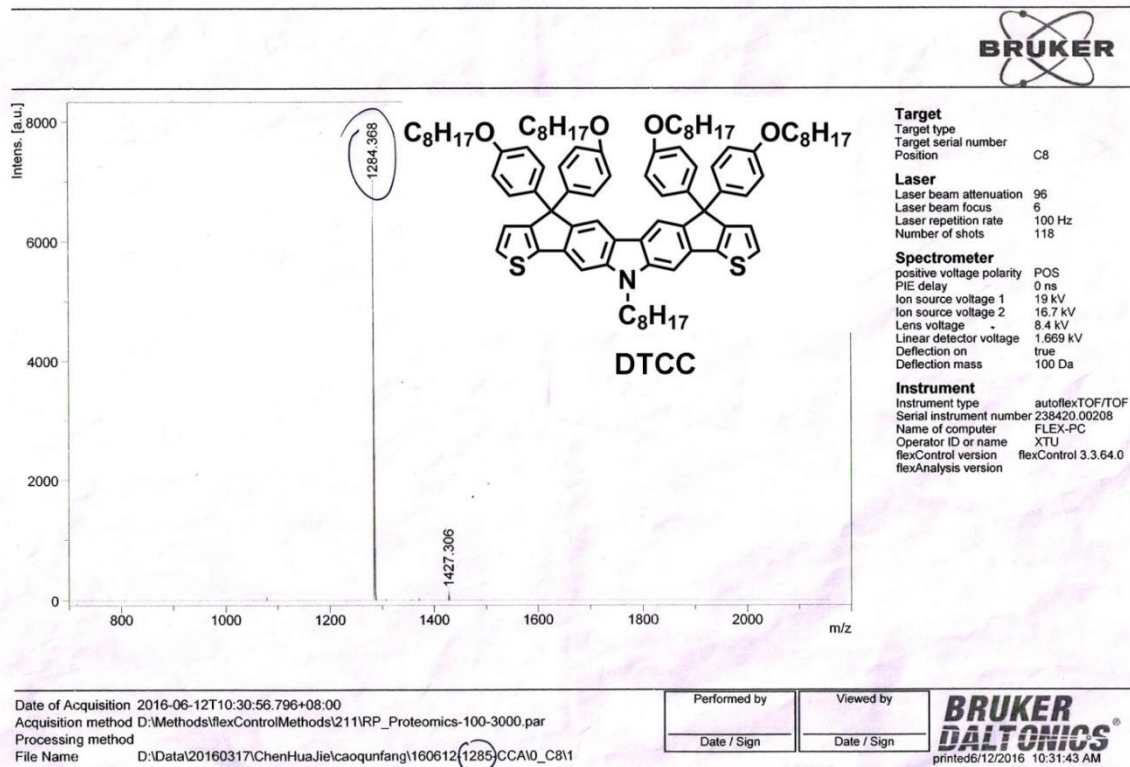
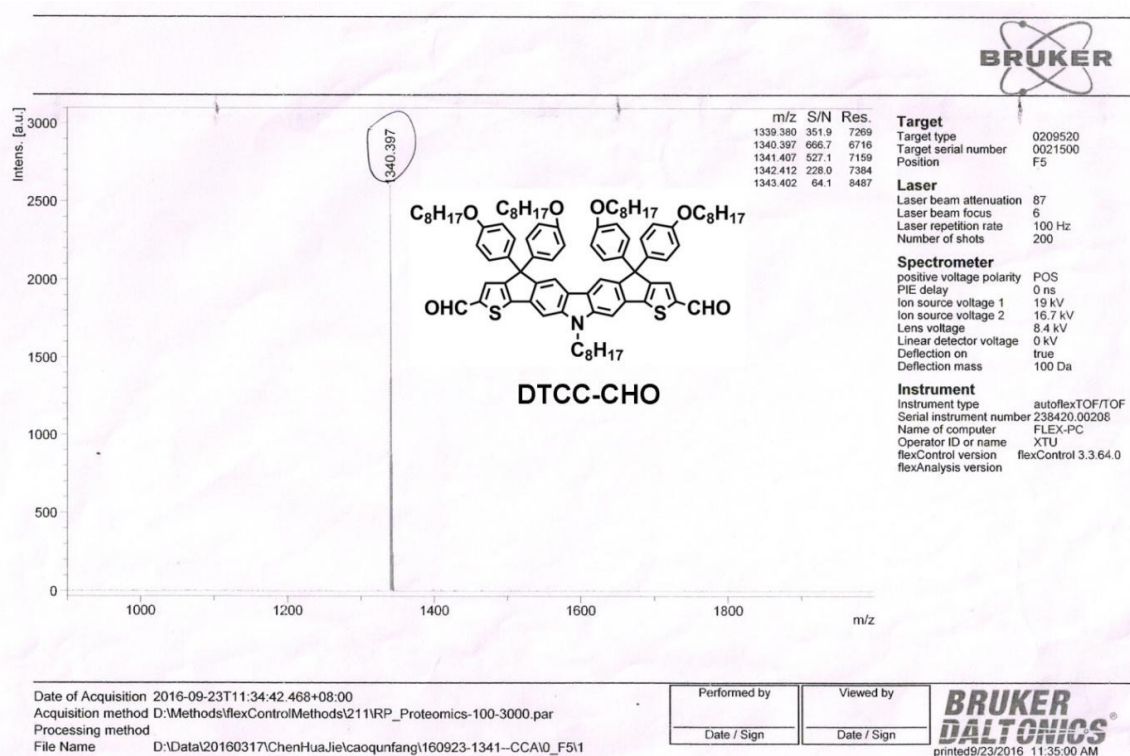


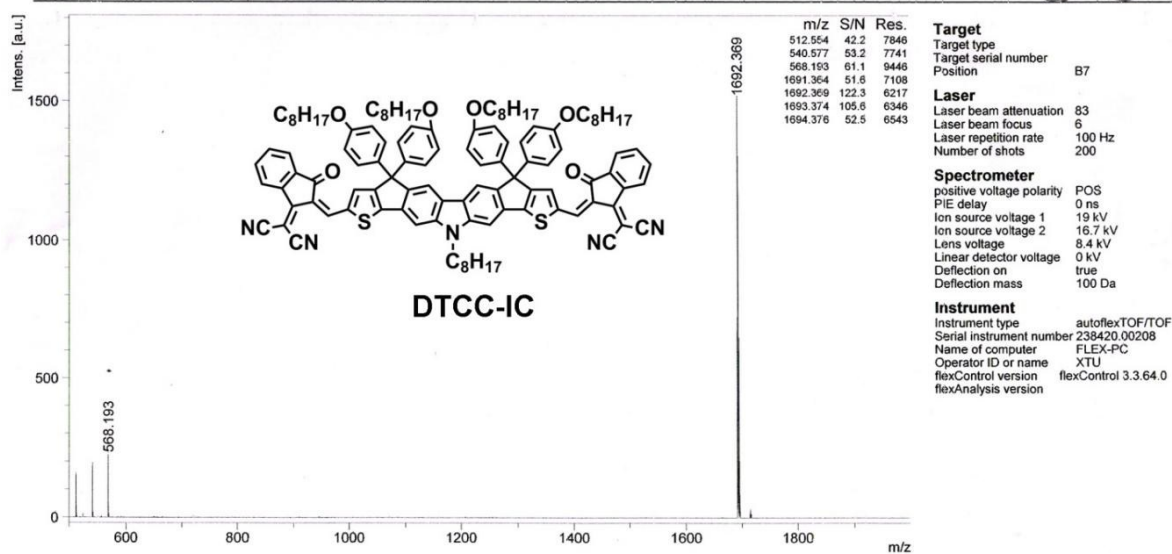
Figure S9. MADI-TOF of compound 2.



**Figure S10.** MADI-TOF of compound DTCC.



**Figure S11.** MADI-TOF of compound DTCC-CHO.



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Figure S12. MADI-TOF of compound DTCC-IC.

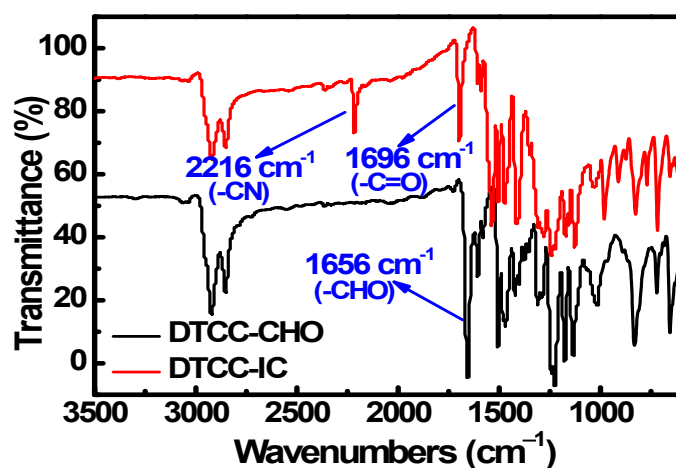
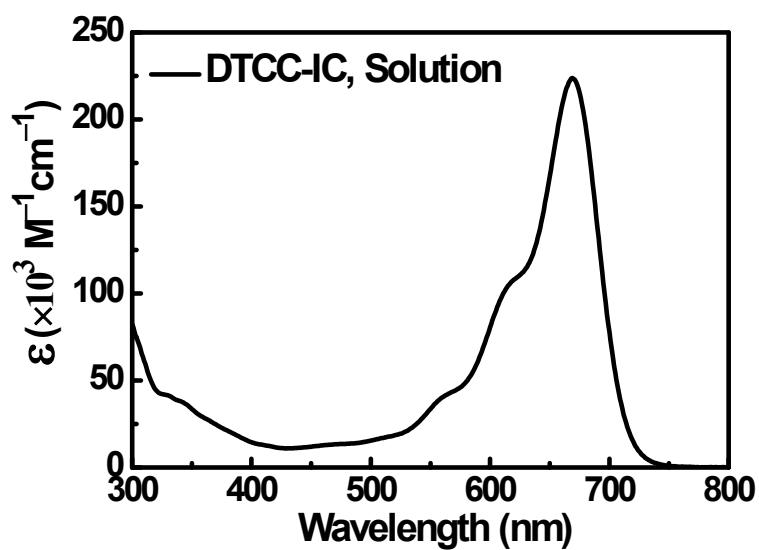
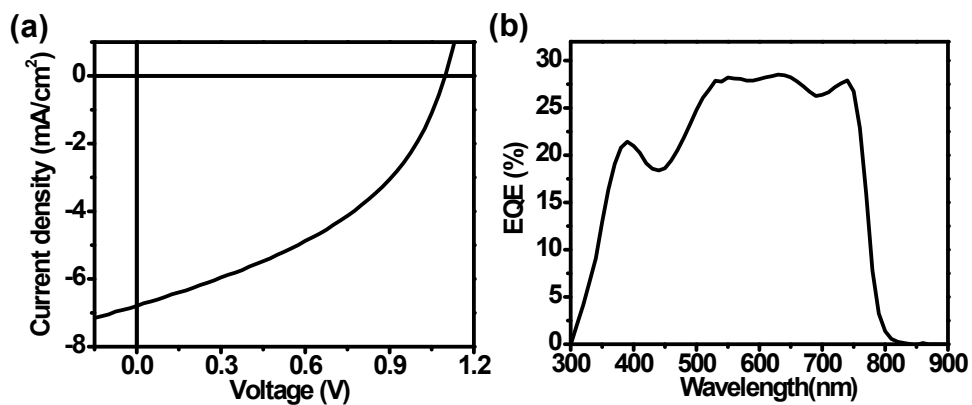


Figure S13. FTIR spectra of the DTCC-CHO and DTCC-IC samples.



**Figure S14.** Molar absorption coefficient of the DTCC-IC in chloroform solution.



**Figure S15.** a)  $J$ - $V$  curves of OSC devices based on the PBT1-EH:DTCC-IC blends and b) the corresponding EQE spectrum.