

## Supporting Information

### A novel D-A-D fluorescent dyes based on 9-(*p*-tolyl)-2,3,4,4a,9,9a-hexahydro-1*H*-carbazole as a donor unit for solution-processed organic light-emitting-diodes

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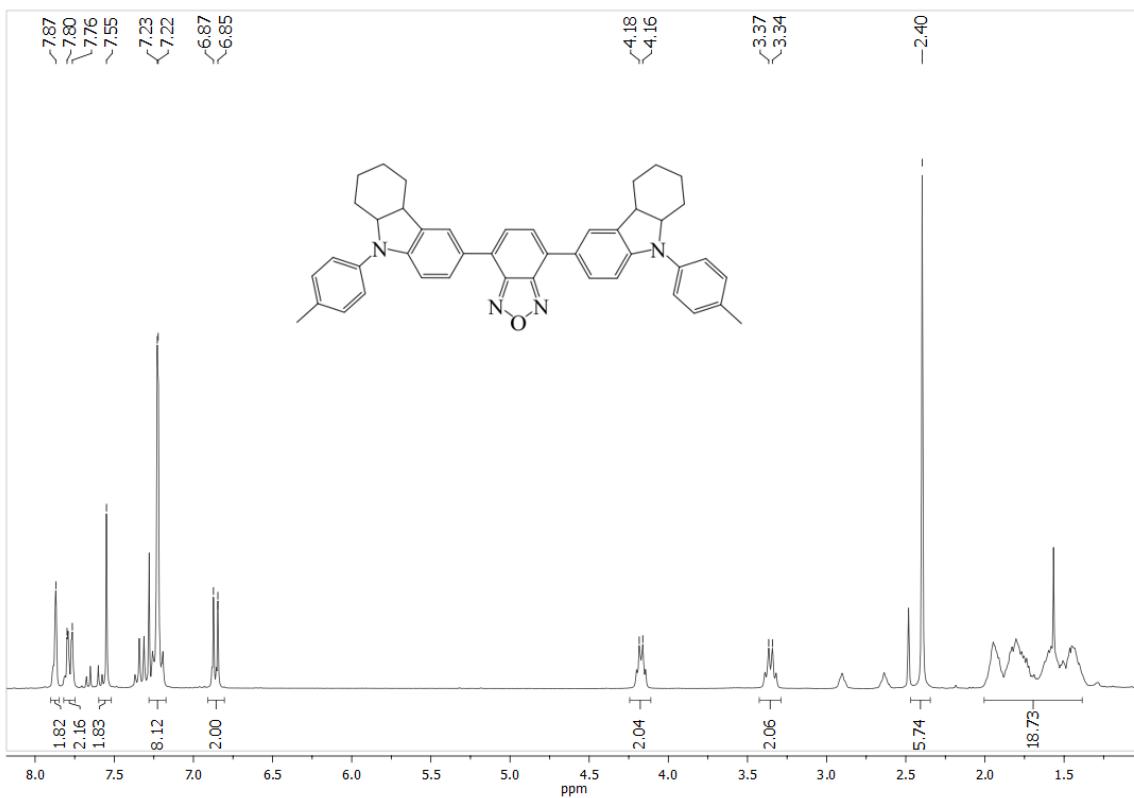
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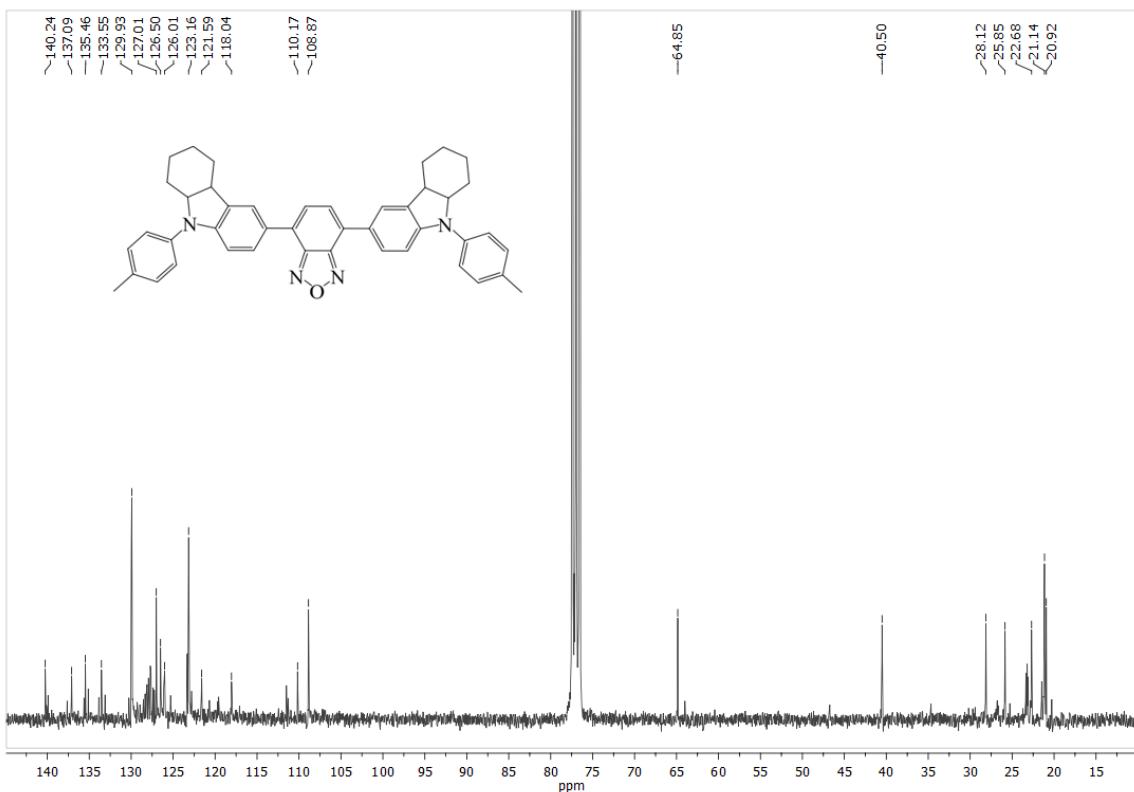
<sup>1</sup>H and <sup>13</sup>C NMR spectra

4,7-Bis(9-(p-tolyl)-2,3,4,4a,9,9a-hexahydro-1H-carbazol-6-yl)benzo[c][1,2,5]oxadiazole (1a)

<sup>1</sup>H NMR (300 MHz)

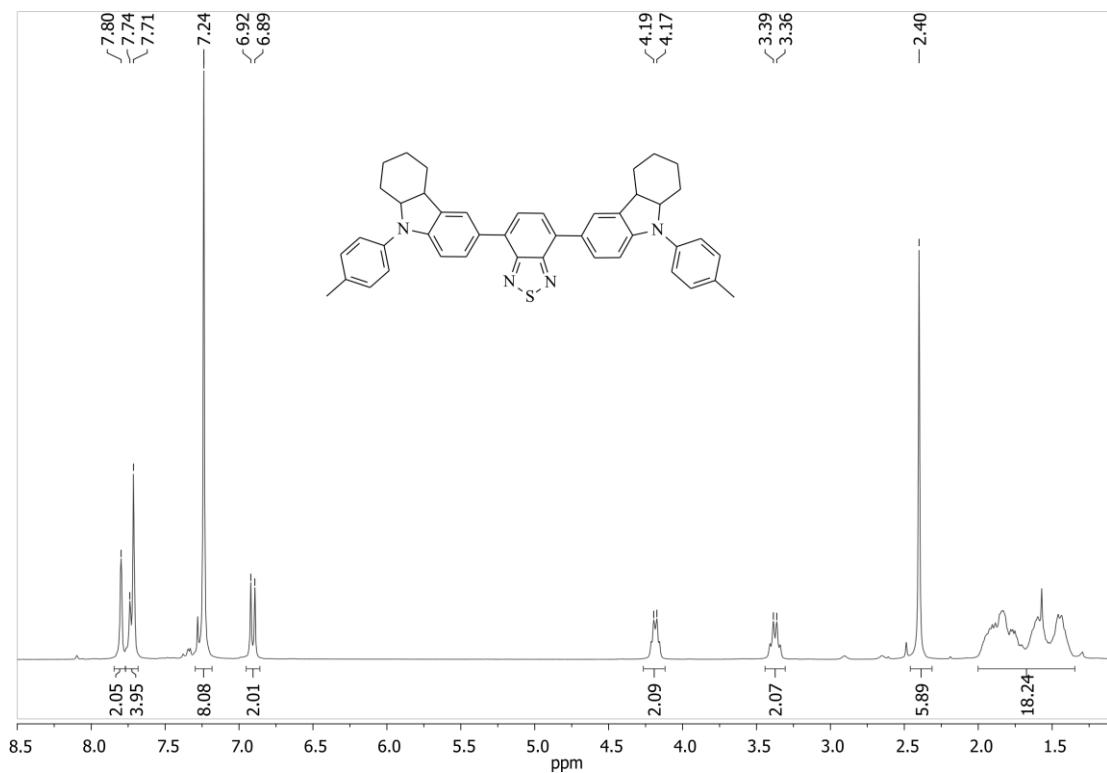


<sup>13</sup>C NMR (75 MHz)

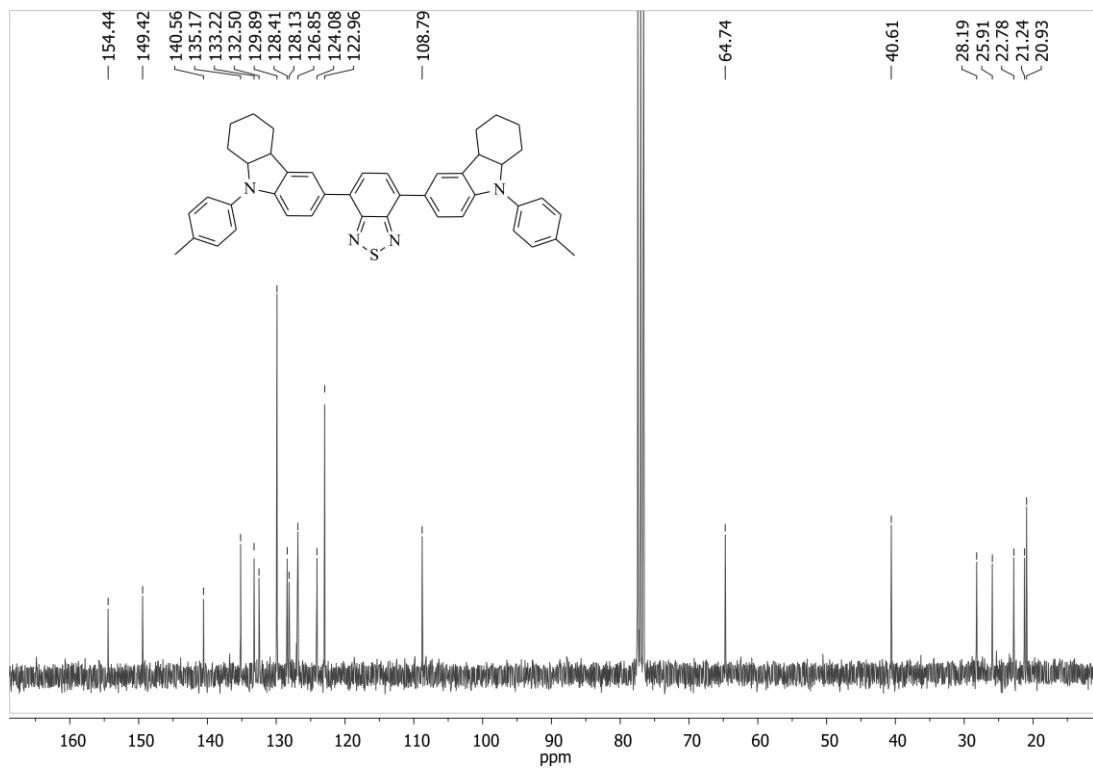


**4,7-Bis(9-(p-tolyl)-2,3,4,4a,9,9a-hexahydro-1H-carbazol-6-yl)benzo[c][1,2,5]thiadiazole (1b)**

**<sup>1</sup>H NMR (300 MHz)**



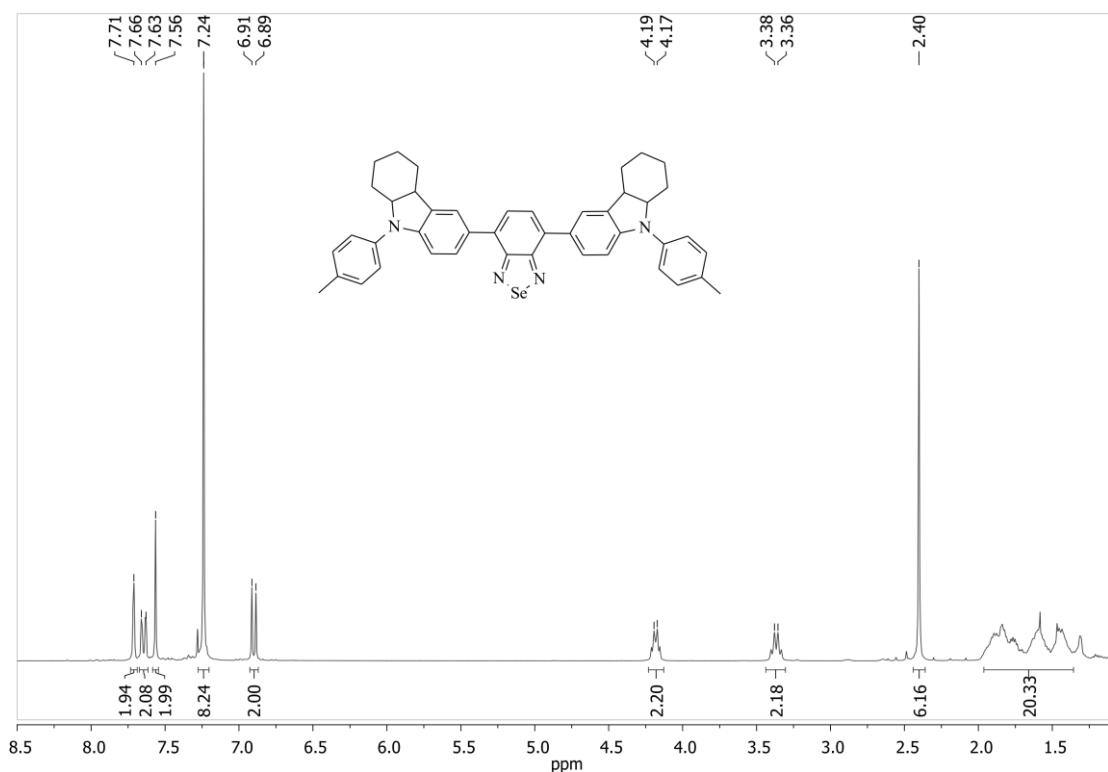
**<sup>13</sup>C NMR (75 MHz)**



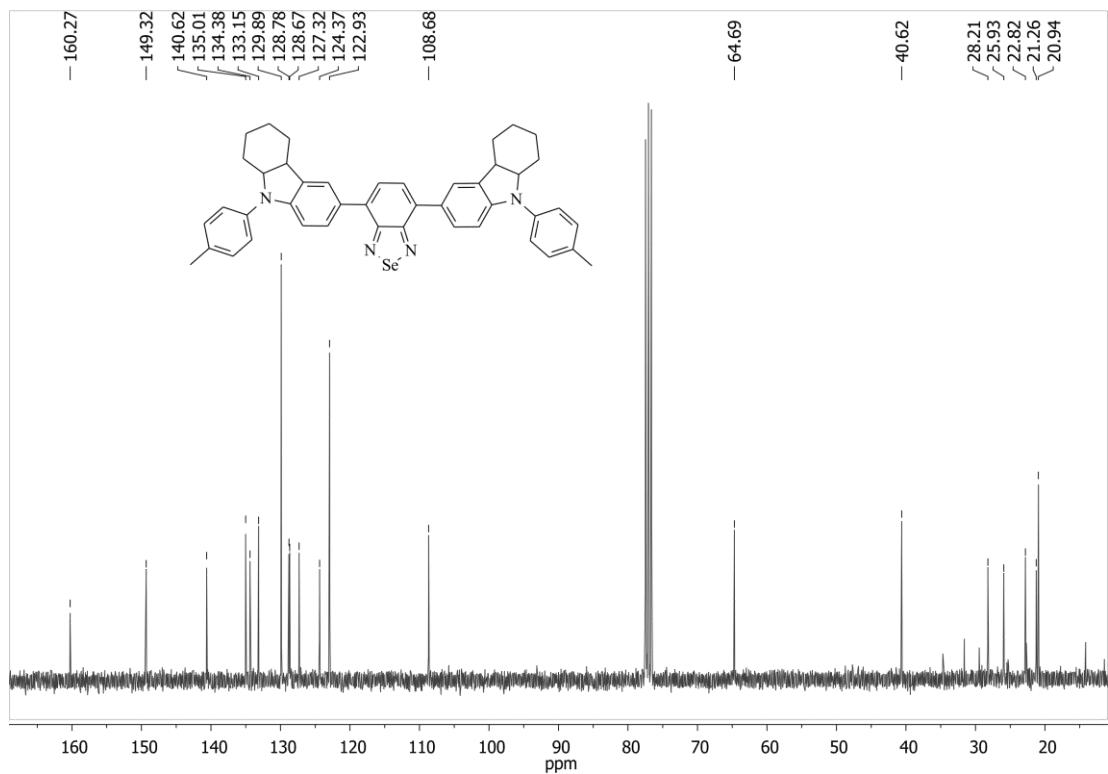
**4,7-Bis(9-(p-tolyl)-2,3,4,4a,9,9a-hexahydro-1H-carbazol-6-yl)benzo[c][1,2,5]selenadiazole**

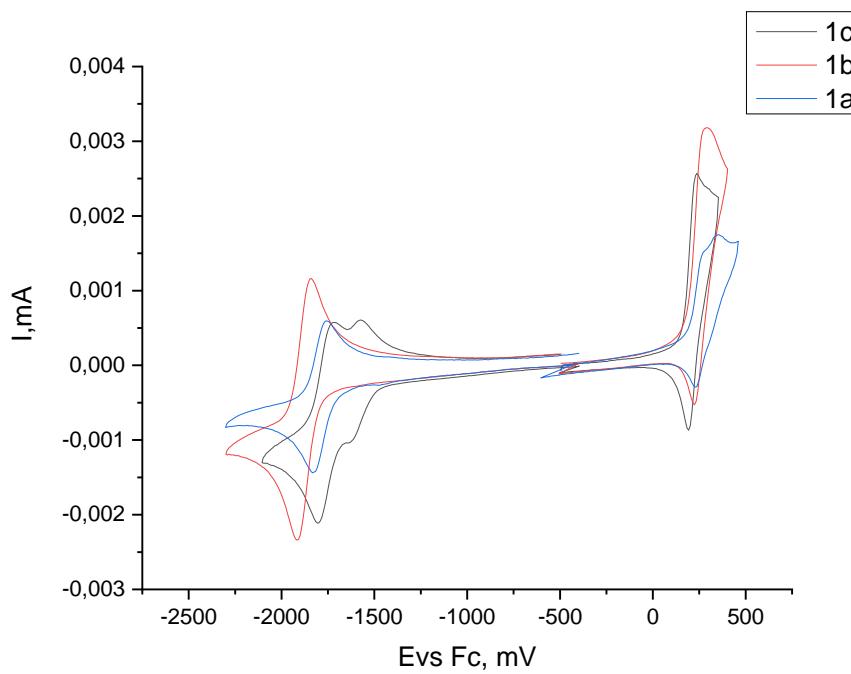
**(1c):**

**$^1\text{H}$  NMR (300 MHz)**

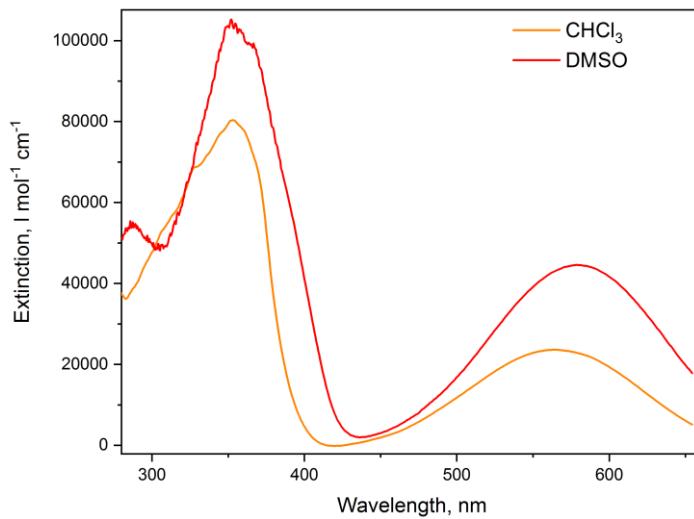


**$^{13}\text{C}$  NMR(75 MHz)**

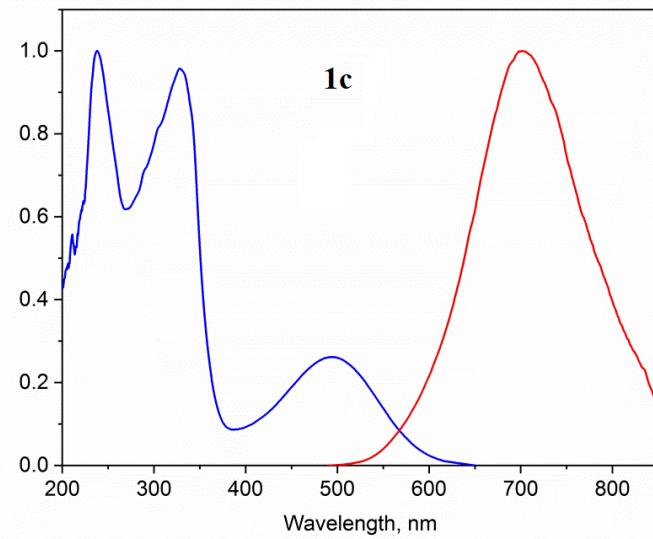
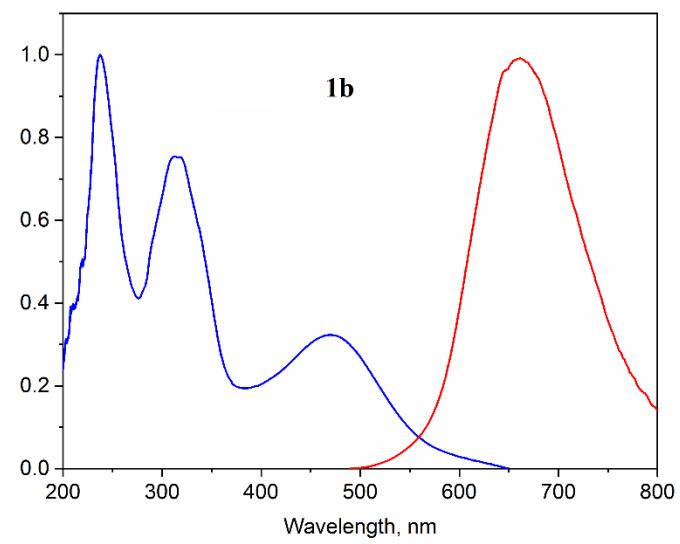
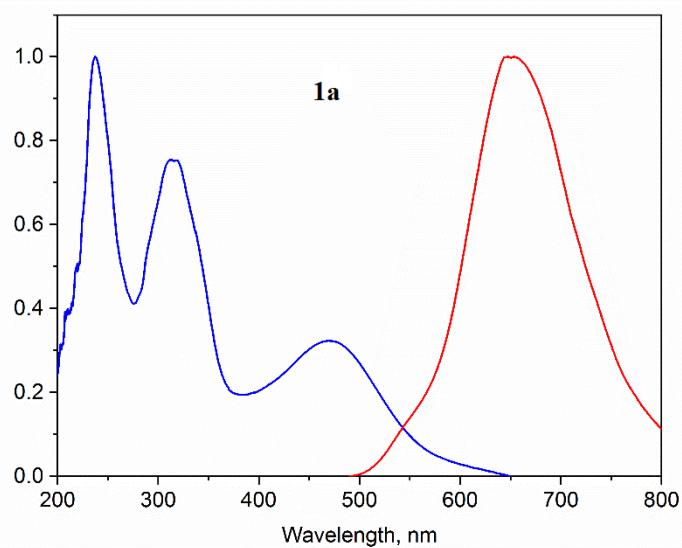




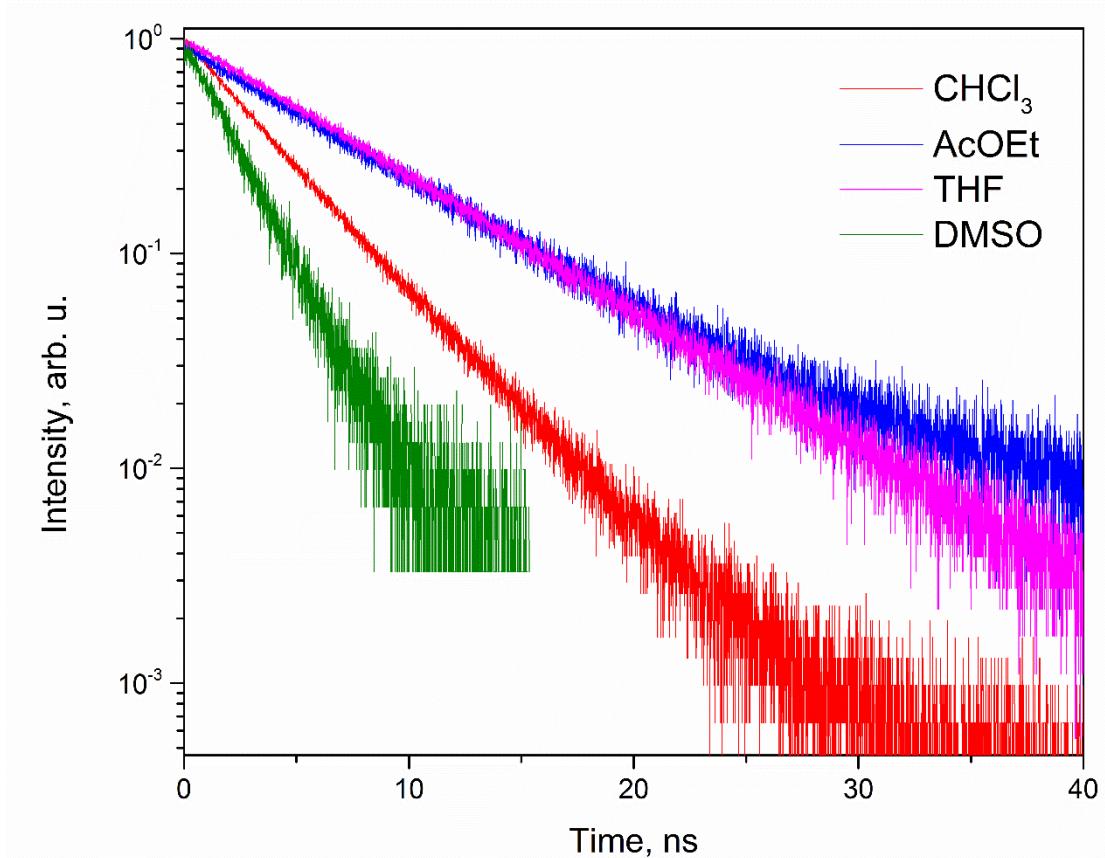
**Figure S1:** Curves of electroreduction and electrooxidation of compounds **1(a-c)** on a platinum electrode at a potential deposition rate of  $0.1 \text{ Vs}^{-1}$  in DMF containing  $0.1 \text{ M Bu}_4\text{NBF}_4$  as a supporting electrolyte.



**Figure S2:** UV-Vis spectra for solutions of **1b**.



**Figure S3:** Experimental determination of  $S_1$  energies for **1(a-c)**: absorption spectra and PL spectra normalized to 1.



**Figure S4:** PL decays for **1b**.