polymers

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Electronic Supplementary Materials

Soluble electrochromic polymers incorporating benzoselenadiazole and electron acceptor units (carbazole or fluorene): synthesis and electronic-optical properties

Jianzhong Xu [1], Qi Ji [1,2], Lingqian Kong [3], Hongmei Du [2], Xiuping Ju [3] and Jinsheng Zhao [2,*]

[1] College of Chemistry and Environmental Science, Hebei University, Baoding 071002, China; xujianzhong@126.com; (J.X.); wangyan@lcu.edu.cn (Q.J.)
[2] Department of Chemistry and Chemical Engineering, Liaocheng University, Liaocheng 252059, China; duhongmei@lcu.edu.cn (H. Du)
[3] Dongchang Colledge, Liaocheng University, Liaocheng 252059, China; lingqiankong@126.com (L.K.); jxp1127@163.com (X.J.)
* Correspondence: zhaojinsheng@lcu.edu.cn; Tel.: +86-635-853-9607

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1. FigureS1. The ^{1}H NMR (upper) and ^{13}C NMR (under) of 4,7-bis(4-hexylthiophen-2-yl)benzo[c][1,2,5]selenadiazole (HT-BSe). x refers to the peak of CDH_3 (solvent), y refers to the peak of H_2O, z refers to the peak of tetramethylsilane (internal standard substance).
2. FigureS2. The ^{1}H NMR (upper) and ^{13}C NMR (under) of 4,7-bis(3,4-bis(hexyloxy)thiophen-2-yl)benzo[c][1,2,5]selenadiazole (HoT-BSe). x refers to the peak of CDH_3 (solvent), y refers to the peak of H_2O, z refers to the peak of tetramethylsilane (internal standard substance).
3. FigureS3. The ^{1}H NMR (upper) and ^{13}C NMR (under) of 4,7-bis(3,4-bis(octyloxy)thiophen-2-yl)benzo[c][1,2,5]selenadiazole (HoT-BSe). x refers to the peak of CDH_3 (solvent), y refers to the peak of H_2O, z refers to the peak of tetramethylsilane (internal standard substance).
4. FigureS4. The ^{1}H NMR (upper) and ^{13}C NMR (under) of 4,7-bis(5-bromo-4-hexylthiophen-2-yl)benzo[c][1,2,5]selenadiazole (2Br-HT-BSe). x refers to the peak of CDH_3 (solvent), y refers to the peak of H_2O, z refers to the peak of tetramethylsilane (internal standard substance).
5. FigureS5 The ^{1}H NMR (upper) and ^{13}C NMR (under) of 4,7-bis(5-bromo-3,4-bis(hexyloxy)thiophen-2-yl)benzo[c][1,2,5]selenadia-zole (2Br-HoT-BSe). x refers to the peak of CDH_3 (solvent), y refers to the peak of H_2O, z refers to the peak of tetramethylsilane (internal standard substance).
6. FigureS6. The ^{1}H NMR (upper) and ^{13}C NMR (under) of 4,7-bis(5-bromo-3,4-bis(octyloxy)thiophen-2-yl)benzo[c][1,2,5]selenadia-zole (2Br-OoT-BSe). x refers to the peak of CDH_3 (solvent), y refers to the peak of H_2O, z refers to the peak of tetramethylsilane (internal standard substance).
7. FigureS7. The ^{1}H NMR of P(HT-BSe-OC). x refers to the peak of CDH_3 (solvent), y refers to the peak of H_2O, z refers to the peak of tetramethylsilane (internal standard substance).
8. Figure S8. The ^{1}H NMR of P(HoT-BSe-OC). x refers to the peak of CDH_3 (solvent), y refers to the peak of H_2O, z refers to the peak of tetramethylsilane (internal standard substance).
9. FigureS9. The ^{1}H NMR of P(OoT-BSe-OC). x refers to the peak of CDH_3 (solvent), y refers to the peak of H_2O, z refers to the peak of tetramethylsilane (internal standard substance).
10. FigureS10. The ^{1}H NMR of P(HT-BSe-OF). x refers to the peak of CDH_3 (solvent), y refers to the peak of H_2O, z refers to the peak of tetramethylsilane (internal standard substance).
11. FigureS11. The ^{1}H NMR of P(HoT-BSe-OF). x refers to the peak of CDH_3 (solvent), y refers to the peak of H_2O, z refers to the peak of tetramethylsilane (internal standard substance).

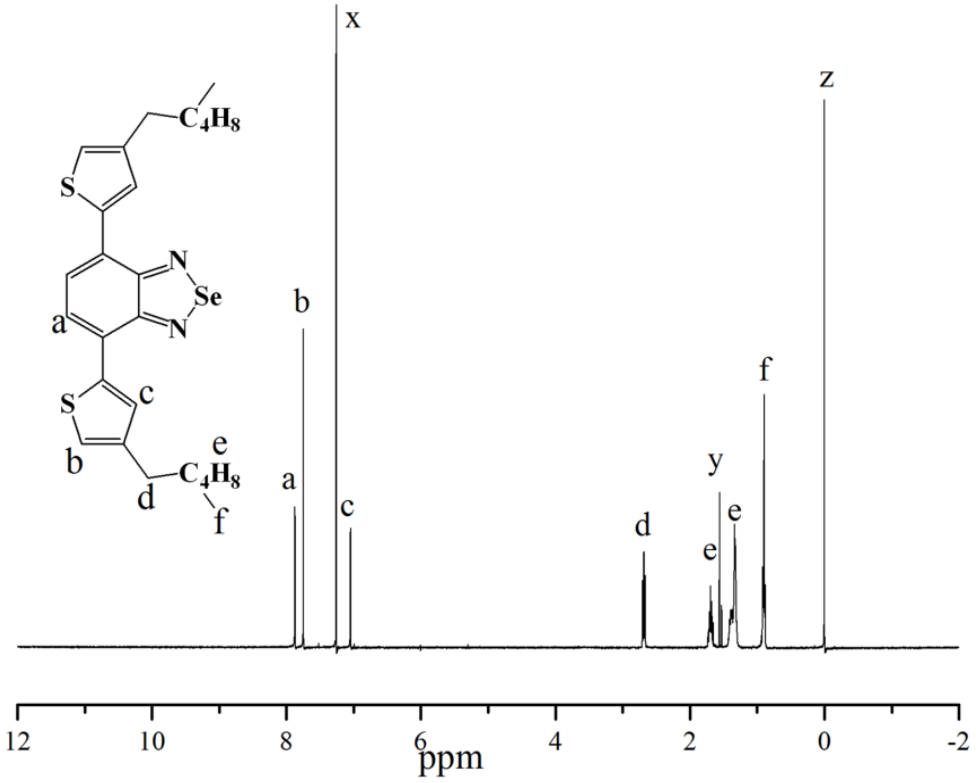
12. FigureS12. The ^{1}H NMR of P(OoT-BSe-OF). x refers to the peak of CDH_3 (solvent), y refers to the peak of H_2O, z refers to the peak of tetramethylsilane (internal standard substance).

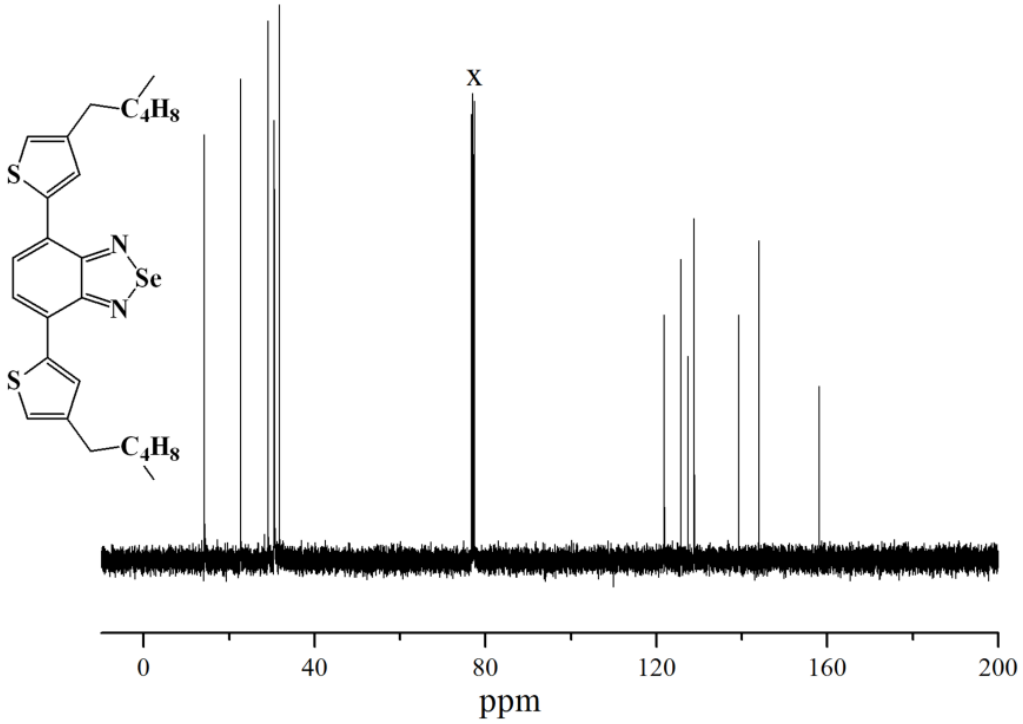
13. FigureS13. Spectroelectrochemical spectra of thee fluorene based copolymers. (a), P(HT-BSe-OF), (b) P(HoT-BSe-OF), (c) P(OoT-BSe-OF).

14. FigureS14. The chronoabsorptometry of three fluorene based polymers with the interval times of 5 s in the square wave potential method. The test wavelengths and the corresponding contrast ratios are labeled in the figures. (a), P(HT-BSe-OF); (b) P(HoT-BSe-OF); (c) P(OoT-BSe-OF).

15. FigureS15. The dependence of the optical contrast ratios on the interval times in the chronoabsorptometry study. The interval times stetted in the in the square wave potential method varied at 10 s, 5 s, 2 s, 1 s in turn. The test wavelengths and the corresponding contrast ratios are labeled in the figures. (a-c), P(HT-BSe-OF); (d-f): P(HoT-BSe-OF); (g-i): P(OoT-BSe-OF).

16. FigureS16. Relative luminance of polymer films as function of the externally applied potentials for three carbazole based copolymers. (a) P(HT-BSe-OF); (b) P(HoT-BSe-OF); (c) P(OoT-BSe-OF).





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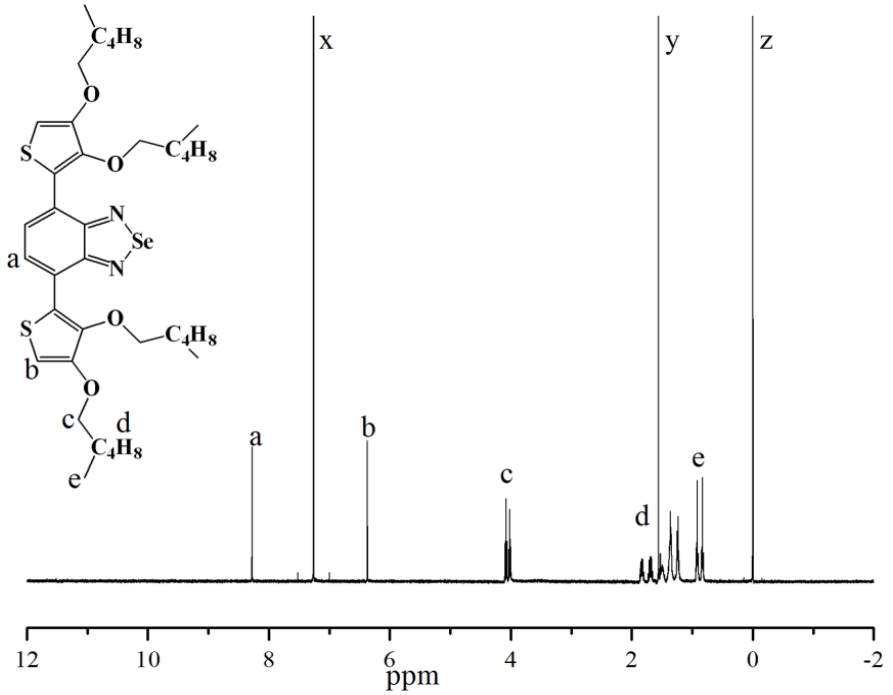


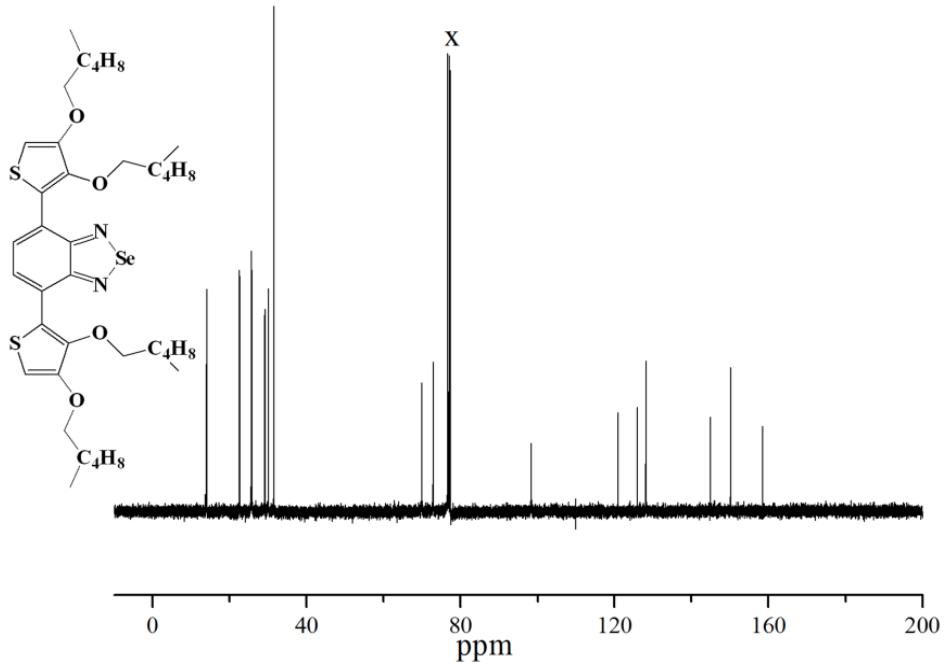
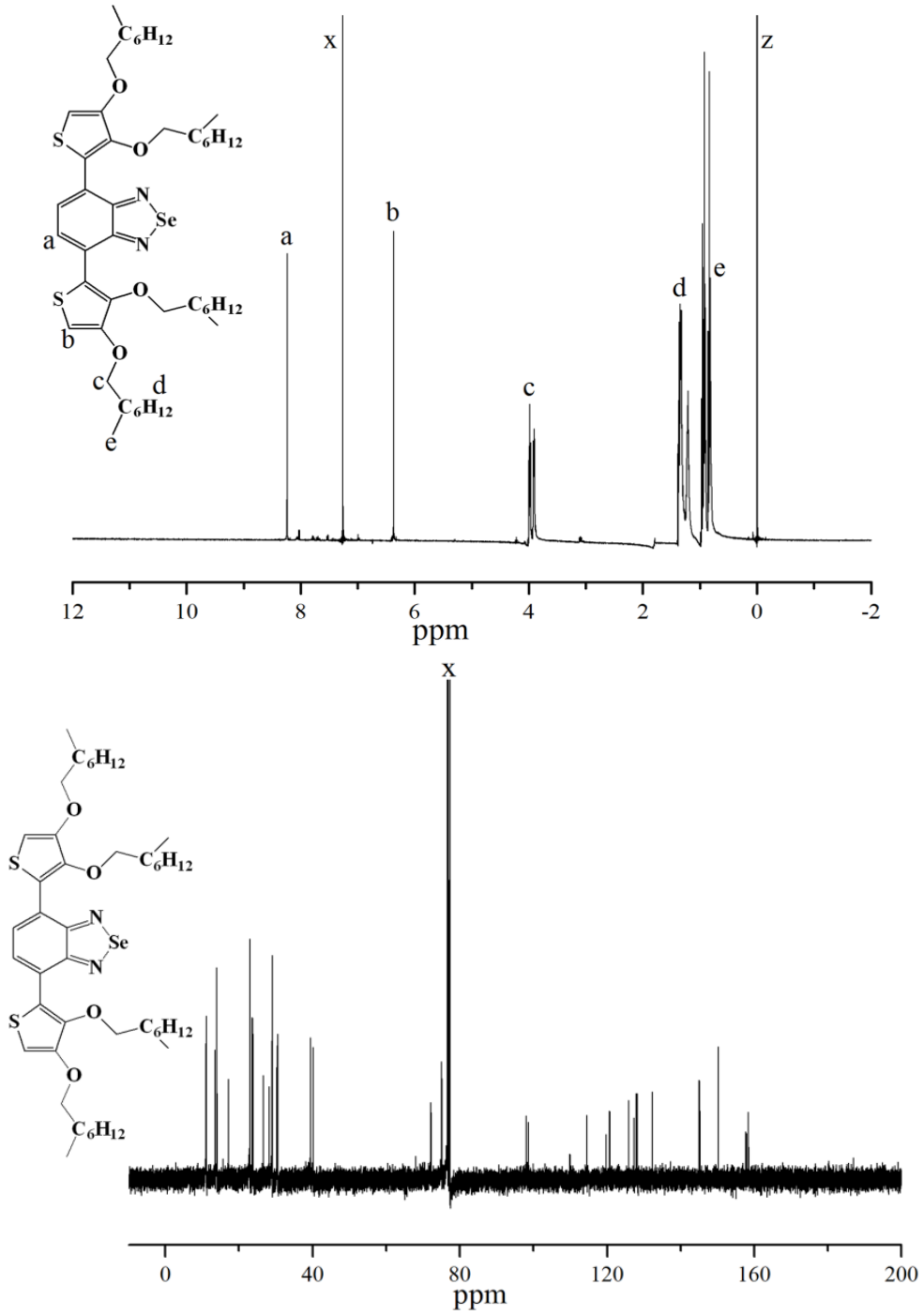


Figure S2. The ^{1}H NMR (upper) and ^{13}C NMR (under) of 4,7-bis(3,4-bis(hexyloxy)thiophen-2-yl)benzo[c][1,2,5]selenadiazole (HoT-BSe). x refers to the peak of CDH_3 (solvent), y refers to the peak of H_2O, z refers to the peak of tetramethylsilane (internal standard substance).



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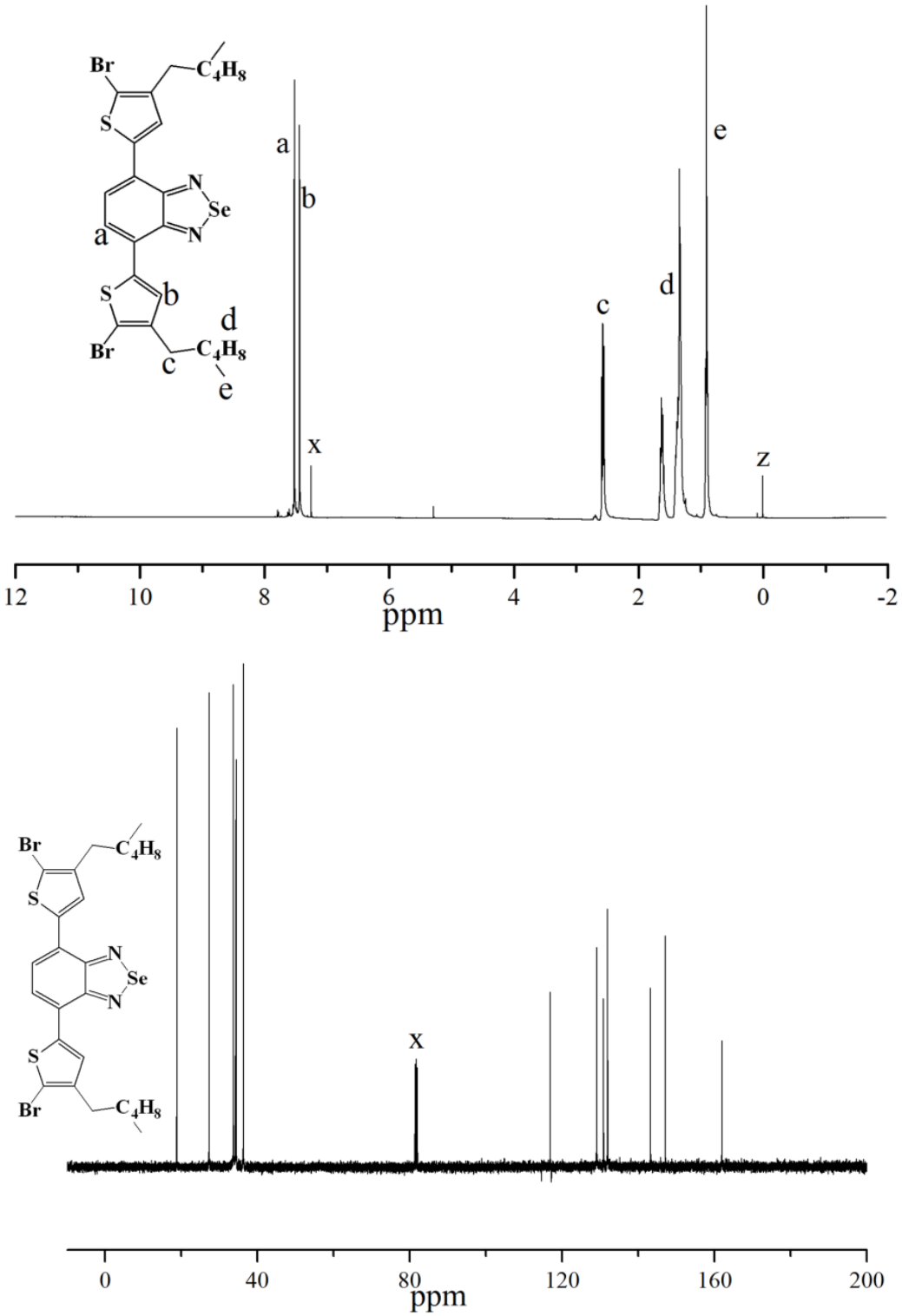

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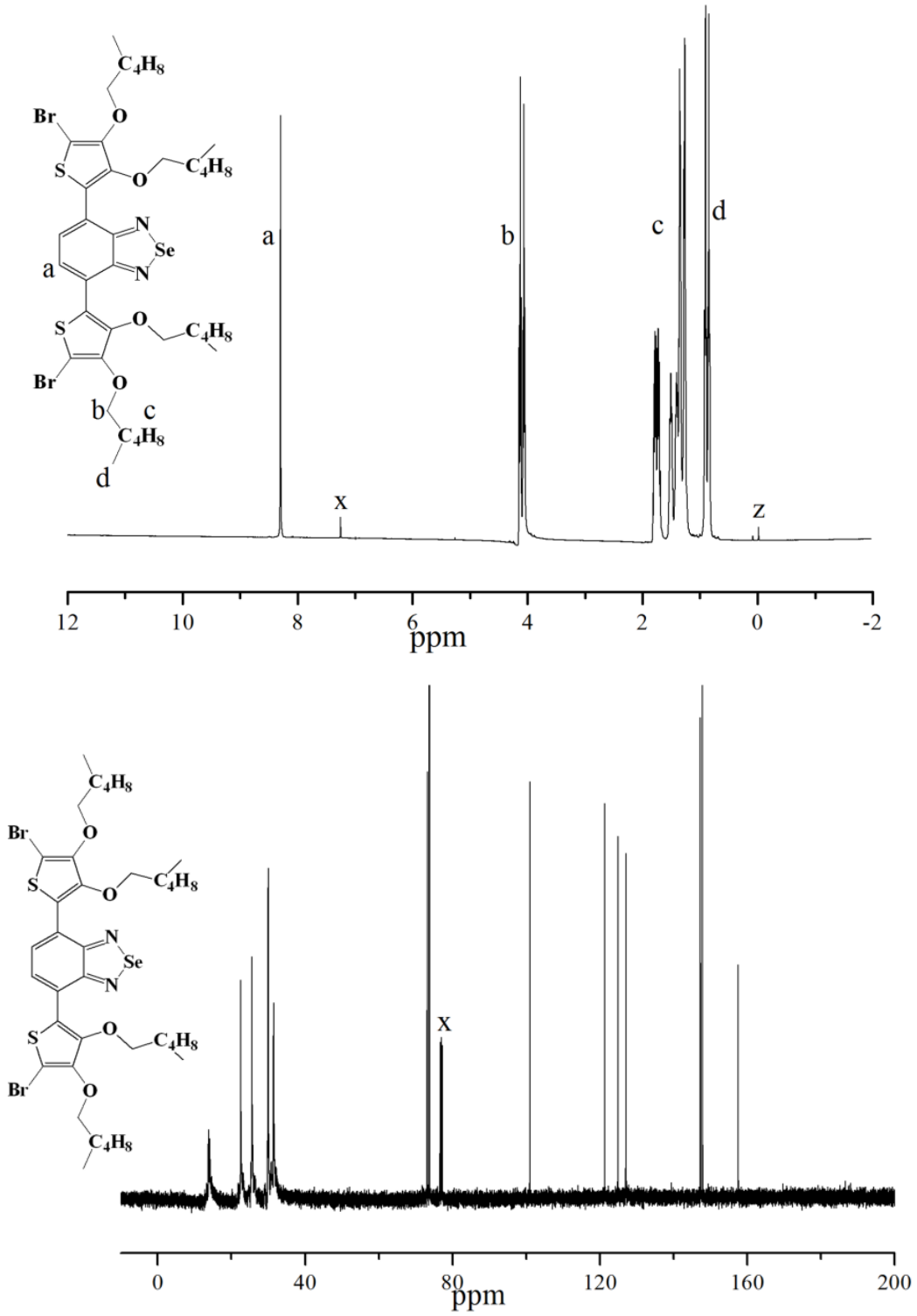

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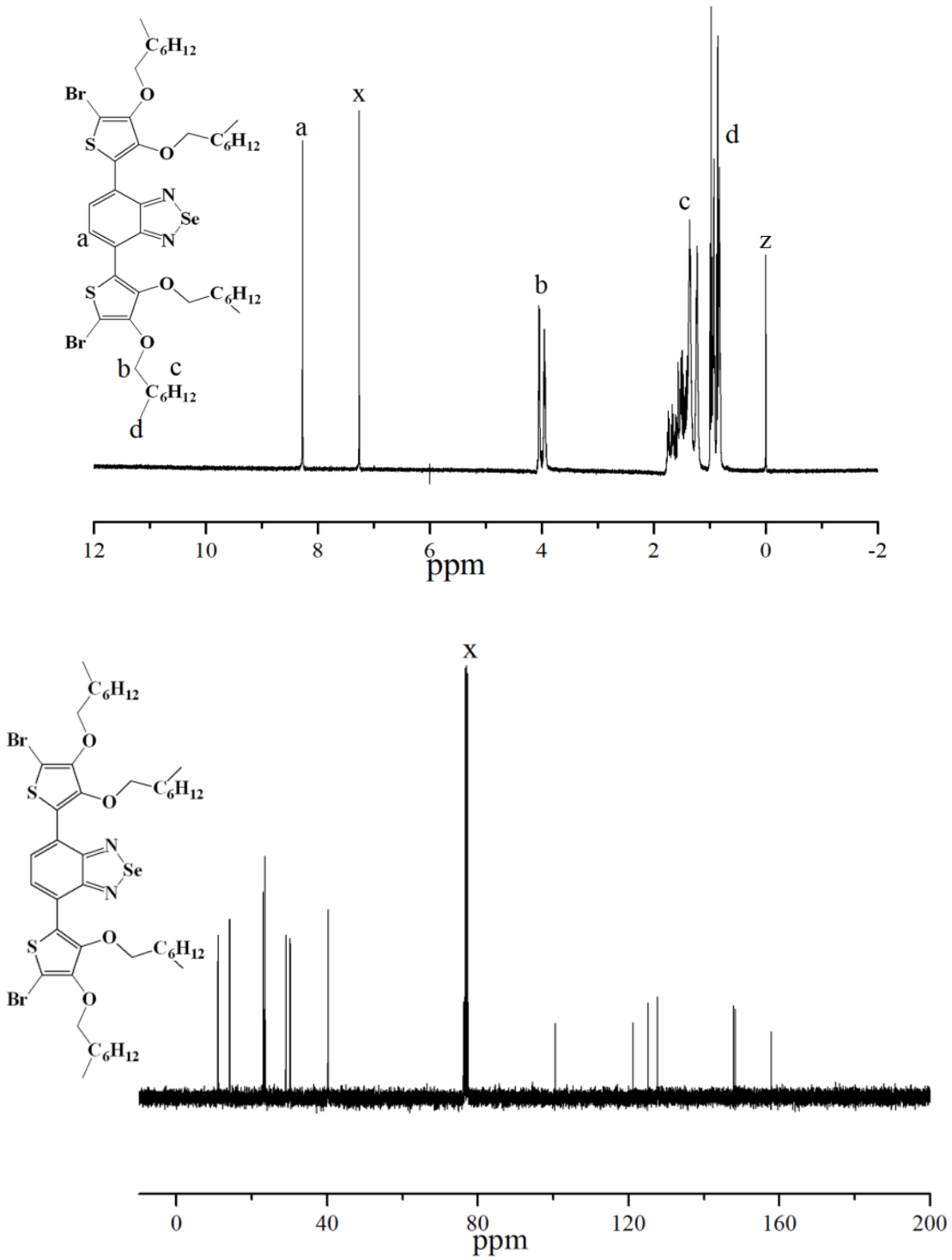

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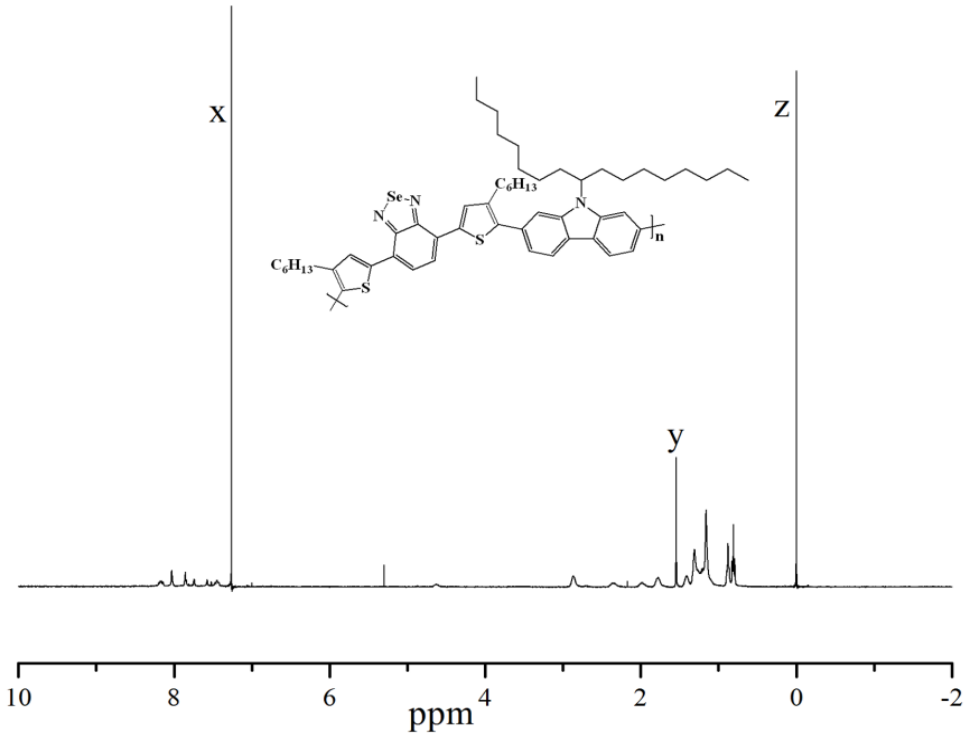

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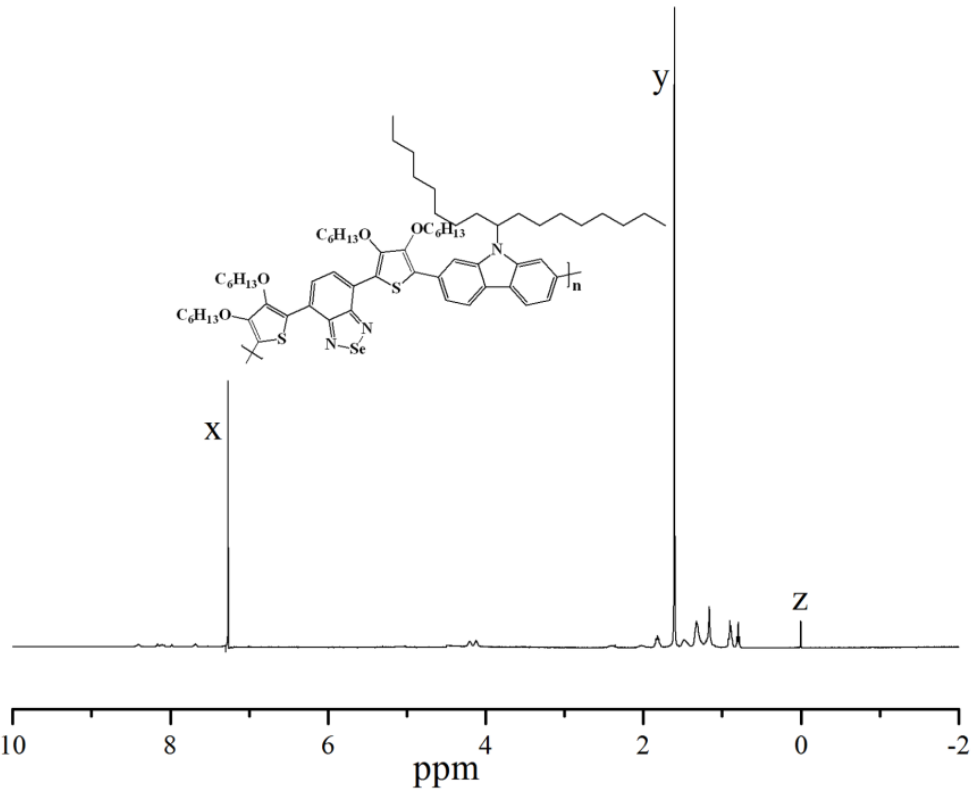

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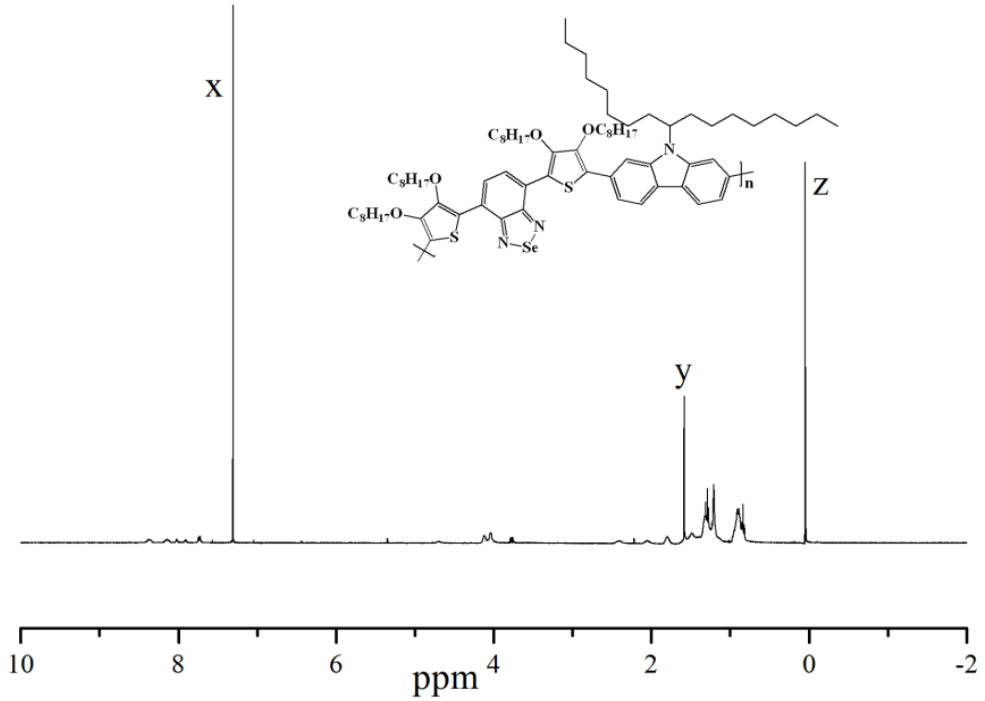

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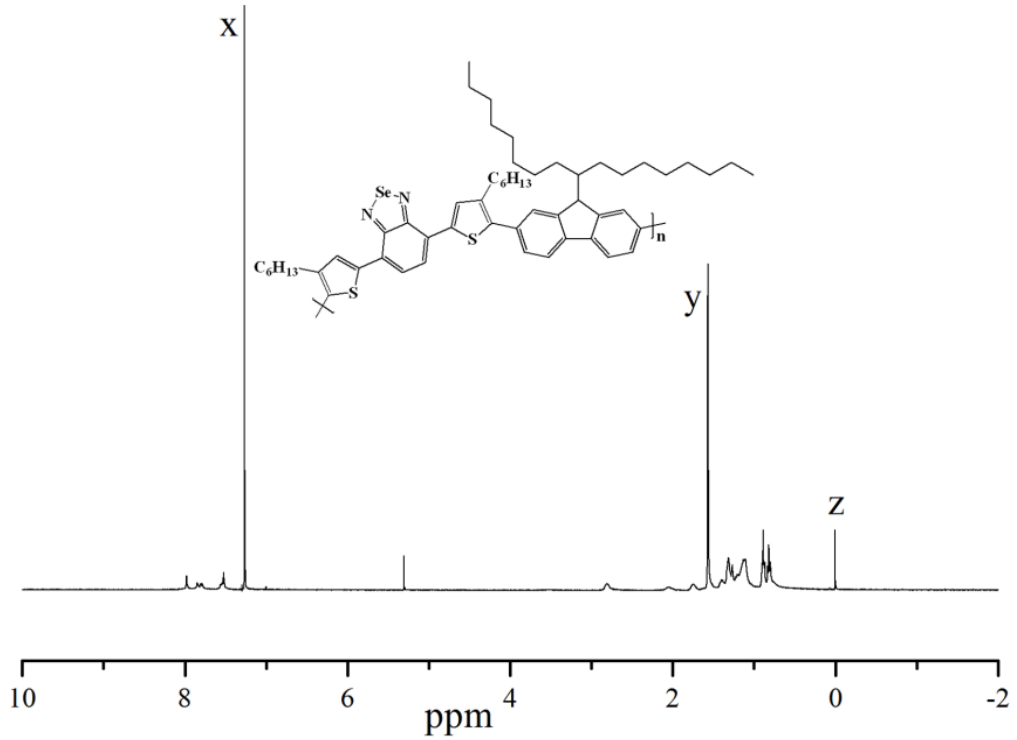

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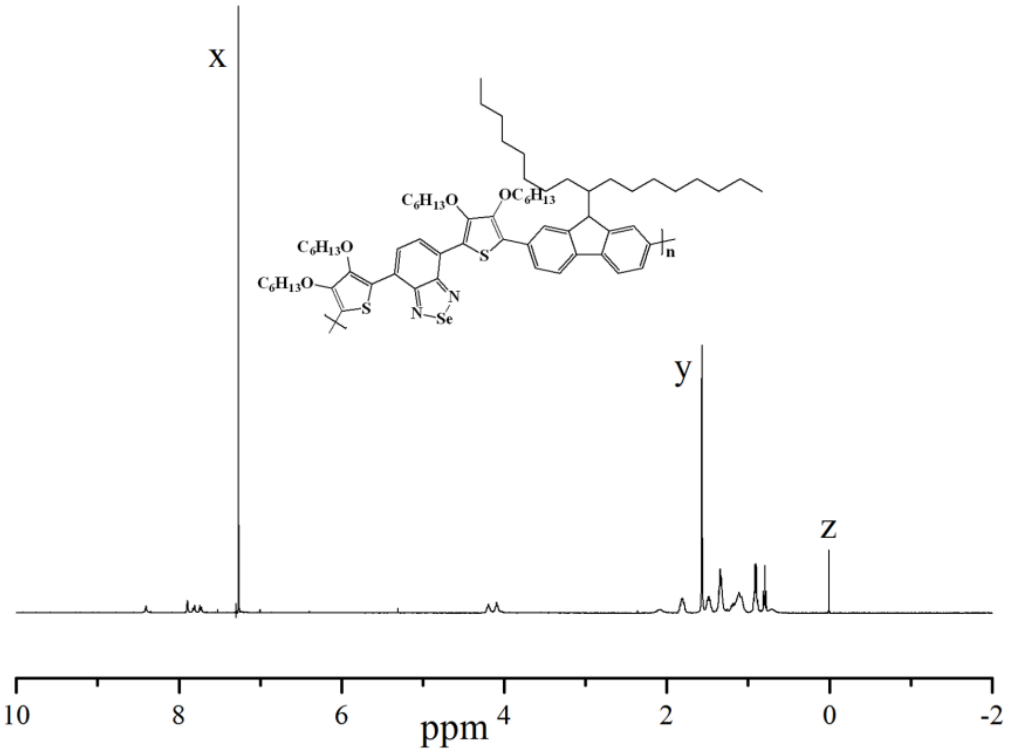

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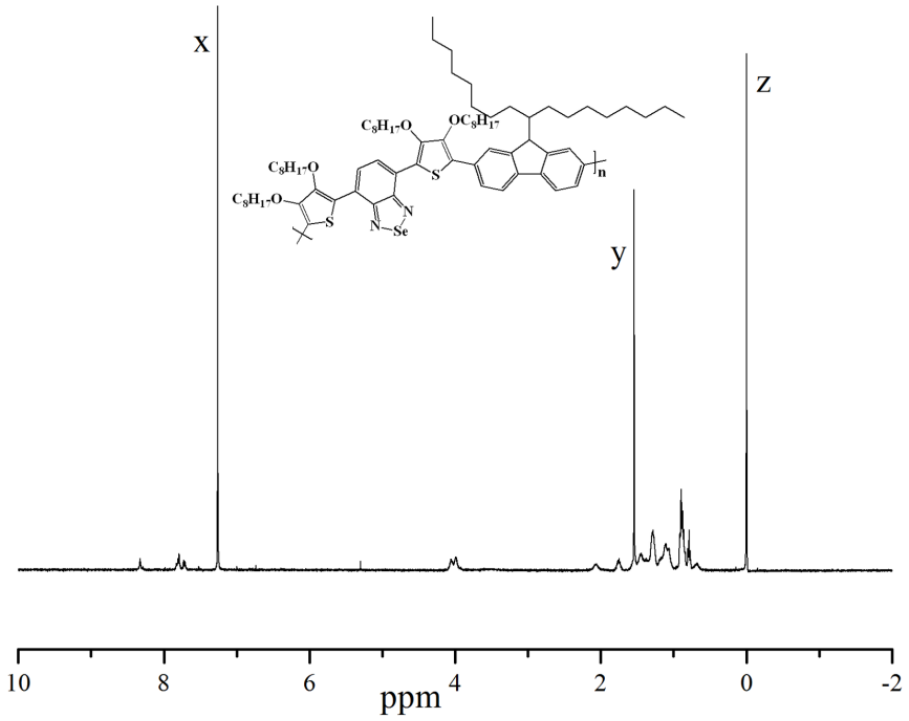

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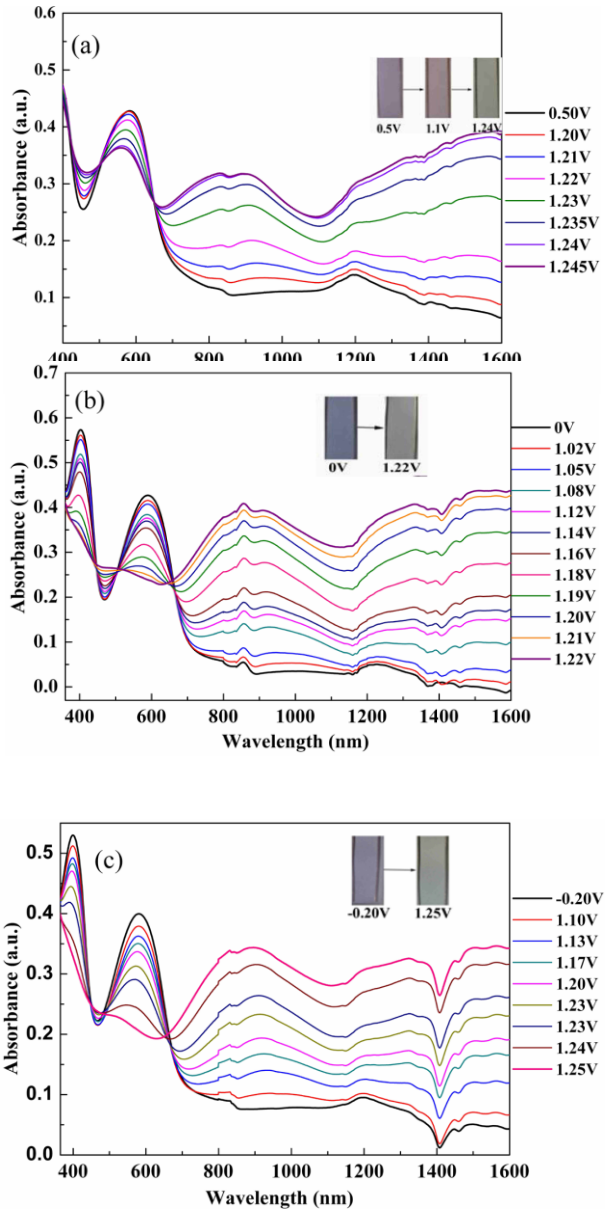

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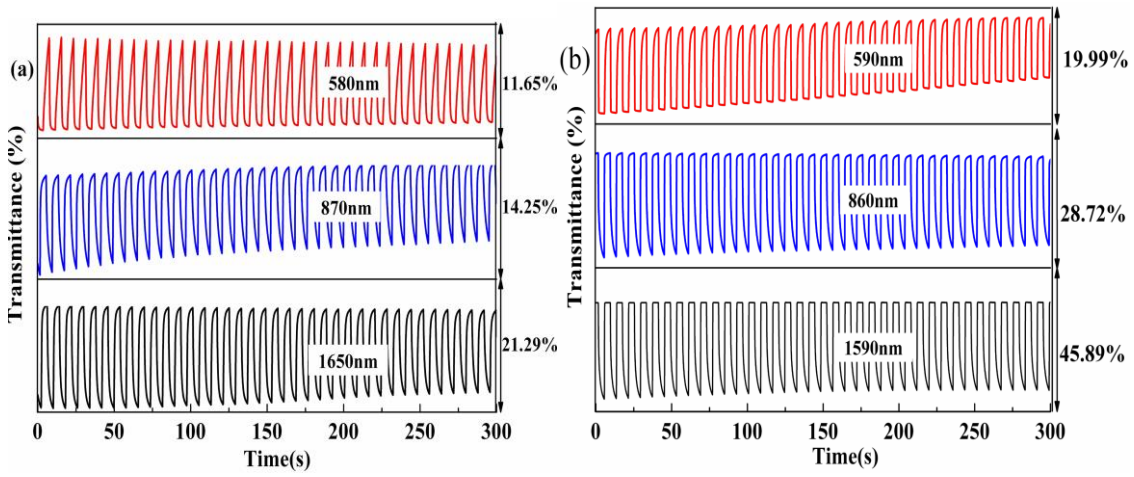

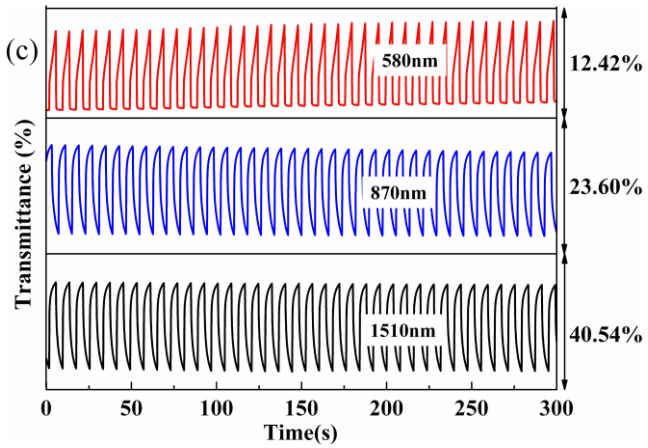

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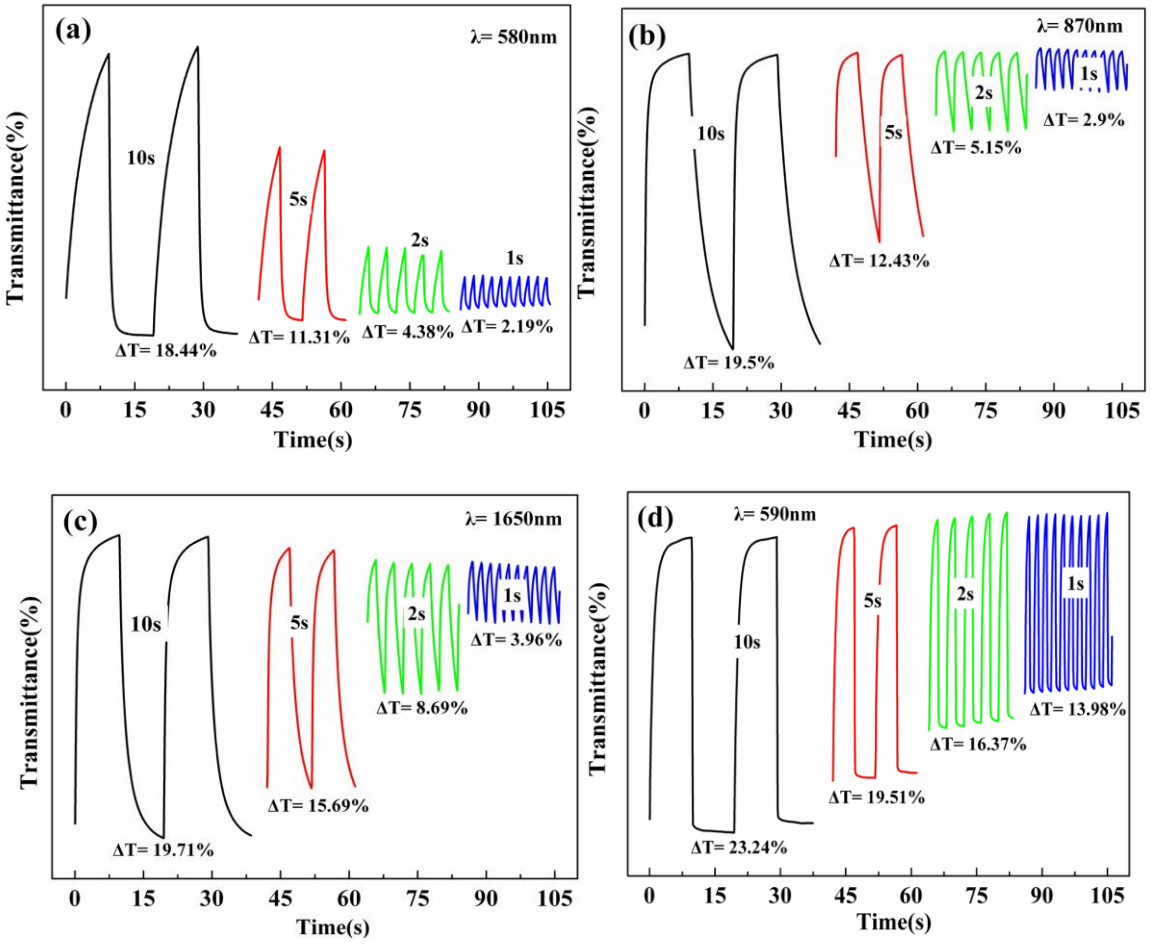

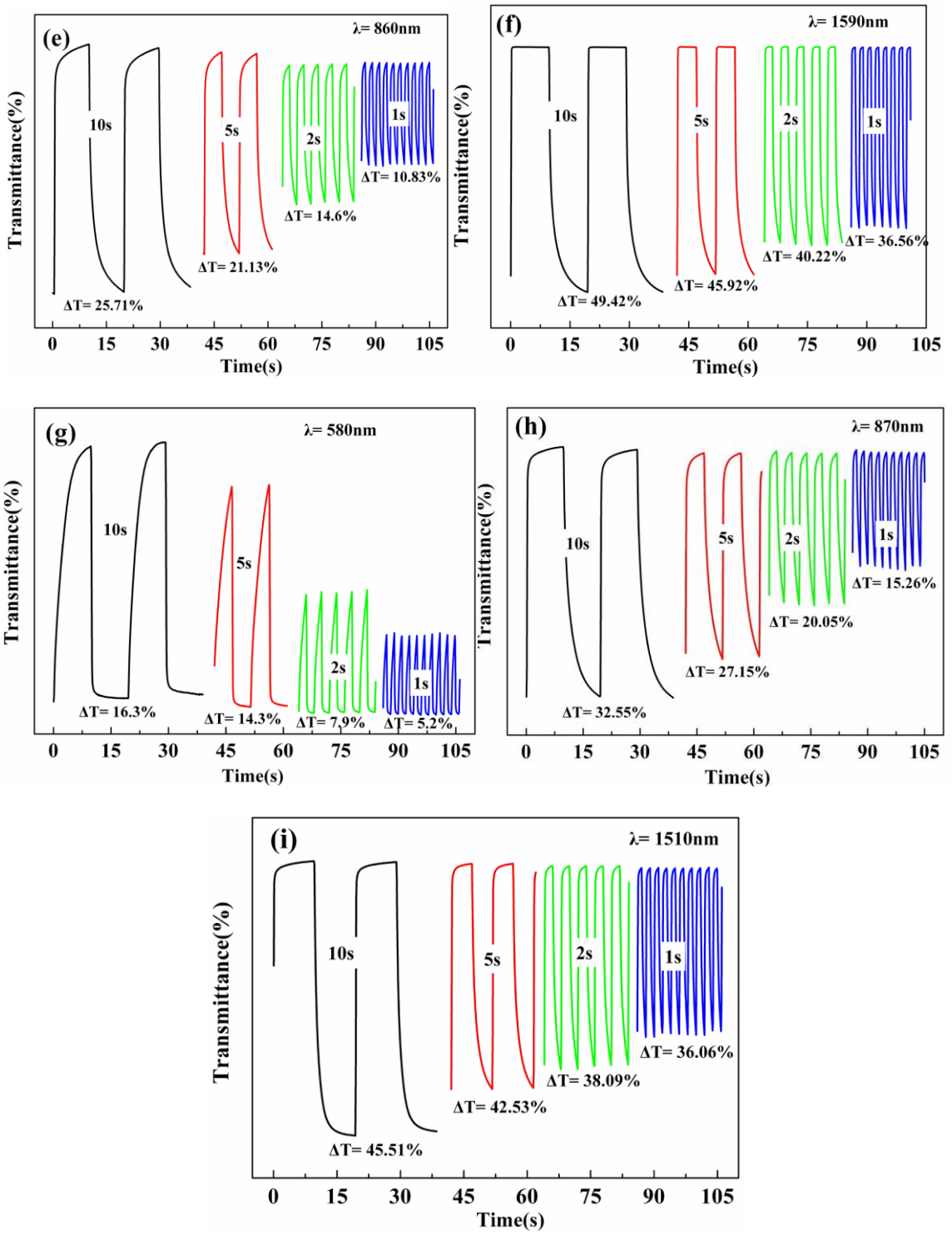

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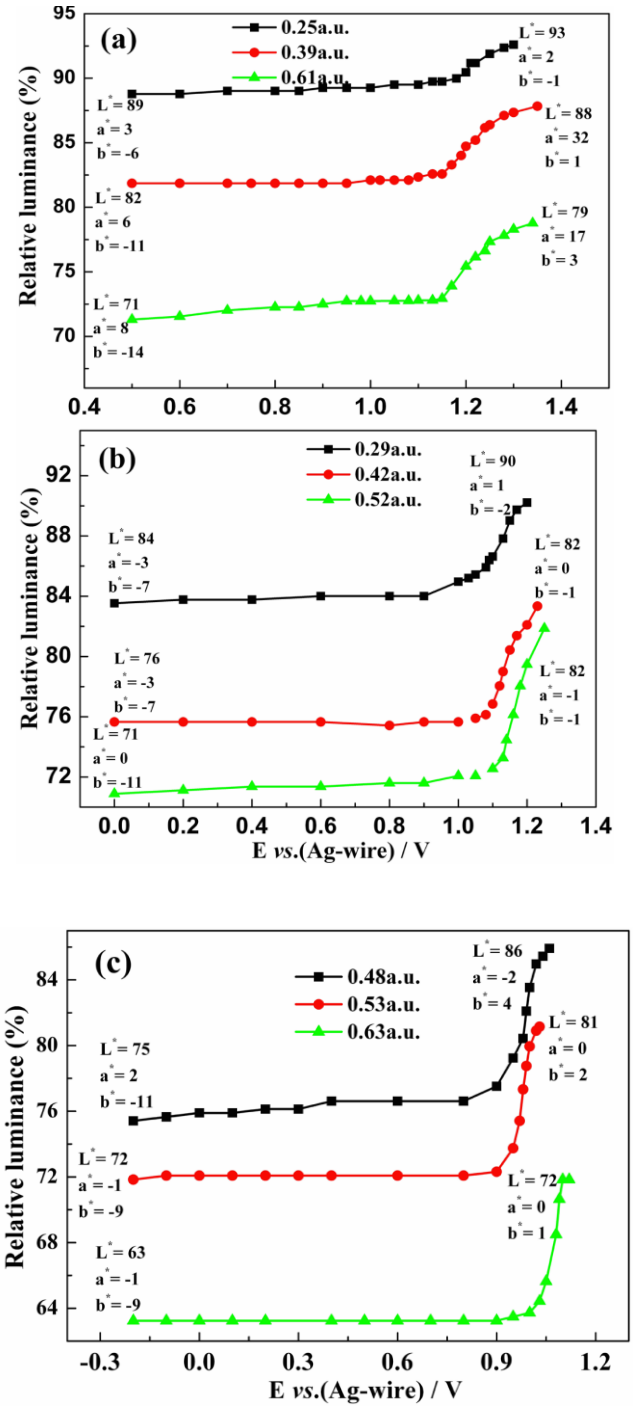

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