

Supporting Information

Electropolymerization of D-A-D type monomers consisting of triphenylamine and substituted quinoxaline moieties for electrochromic devices

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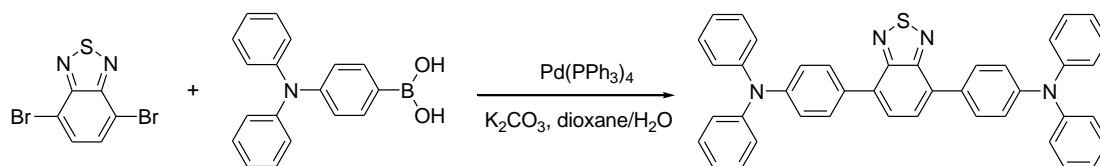
Fig. S8 ^{13}C NMR spectra of **TPAQ-Phen** in CDCl_3-d .

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Synthesis of N-(4-(4-(4-(diphenylamino)phenyl)benzo[c][1,2,5]thiadiazol-7-yl)phenyl)-N-phenylbenzenamine



To a stirred solution of 4,7-dibromobenzo[c][1,2,5]thiadiazole (1 g, 3.4 mmol), 4-(diphenylamino)phenylboronic acid (2.36 g, 8.16 mmol) in a mixed solvent of dioxane (40 mL) and H₂O (8 mL) was added potassium carbonate (3.38 g, 24.5 mmol), followed by tetrakis(triphenylphosphine)palladium (393 mg, 0.34 mmol) as a catalyst. The resulting mixture was stirred at 90 °C for 12 h under N₂ atmosphere. Evaporation of the organic solvent under vacuum, 50 mL of water was added, and extracted with dichloromethane. The combined organic layers were washed with water and brine, dried over anhydrous Na₂SO₄, and concentrated under reduced pressure. The crude product was purified by chromatography to get the desired product as an orange solid (1.95 g, yield: 93%). ¹H NMR (600 MHz, CDCl₃) δ 7.9 (m, *J* = 9 Hz, 4H), 7.77 (s, 2H), 7.29 (t, *J* = 7.2 Hz, 8H), 7.26 ~ 7.18 (m, 12H), 7.07 (t, *J* = 7.2 Hz, 4H). ¹³C NMR (150 MHz, CDCl₃) δ 154.29, 148.11, 147.62, 132.29, 131.14, 130.03, 129.49, 127.56, 125.02, 123.42, 123.07.

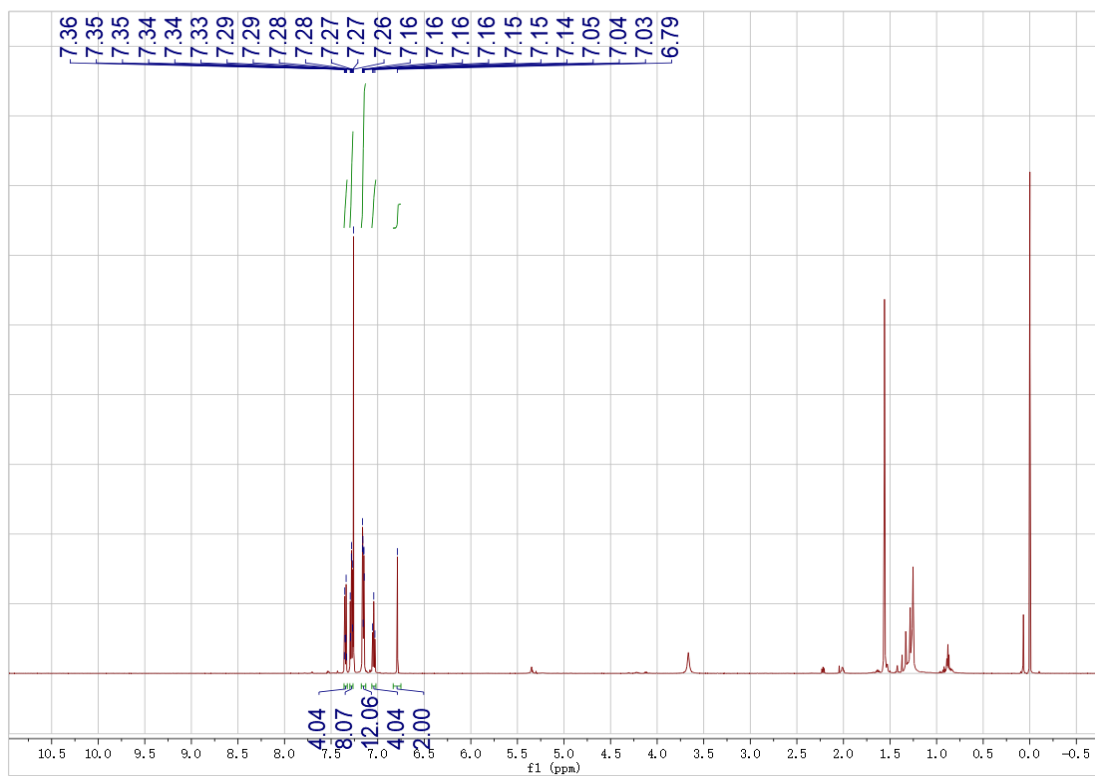


Fig. S1 ^1H NMR spectra of compound **1** in $\text{DMSO-}d_6$.

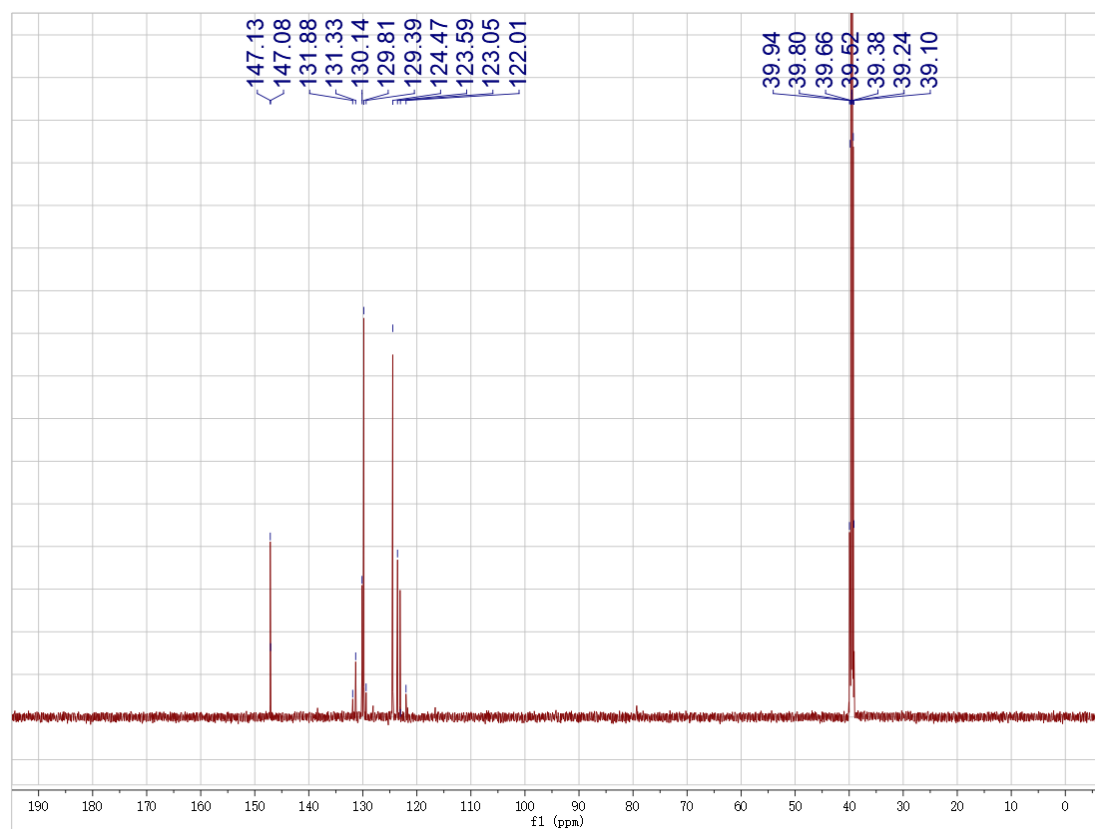


Fig. S2 ^{13}C NMR spectra of compound **1** in $\text{DMSO-}d_6$.

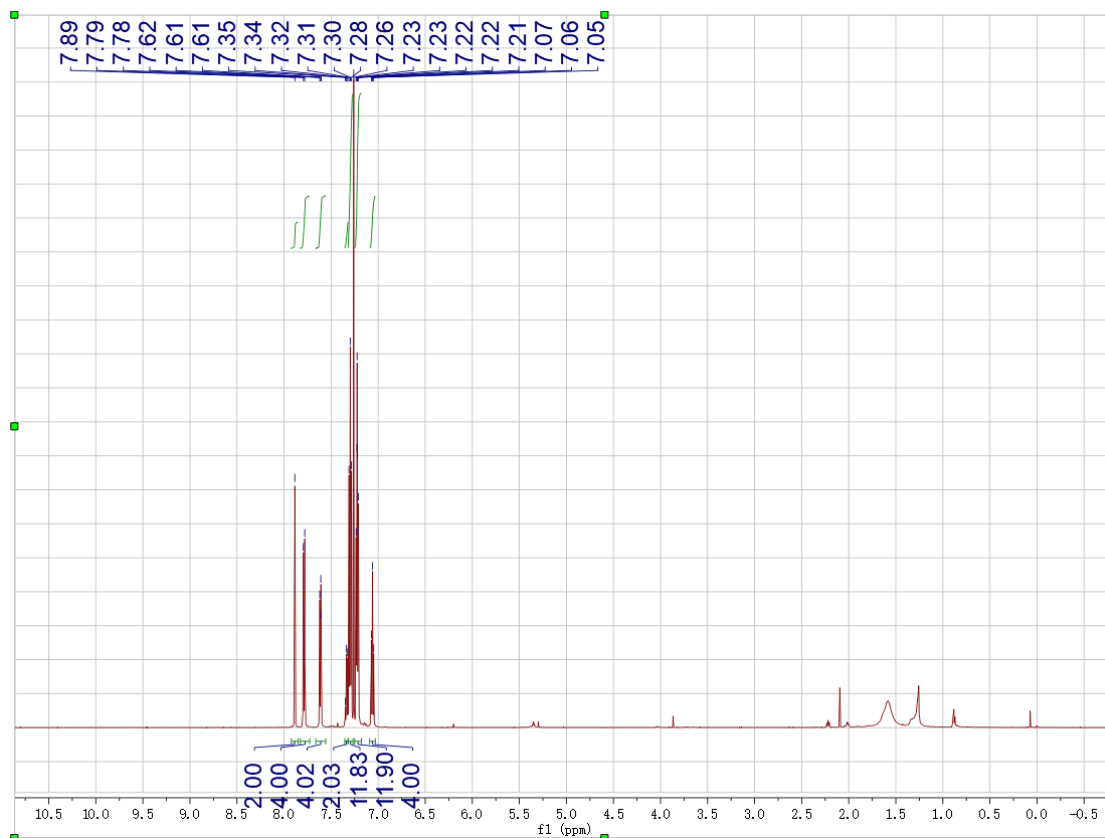


Fig. S3 ^1H NMR spectra of TPAQ-Ph in CDCl_3 .

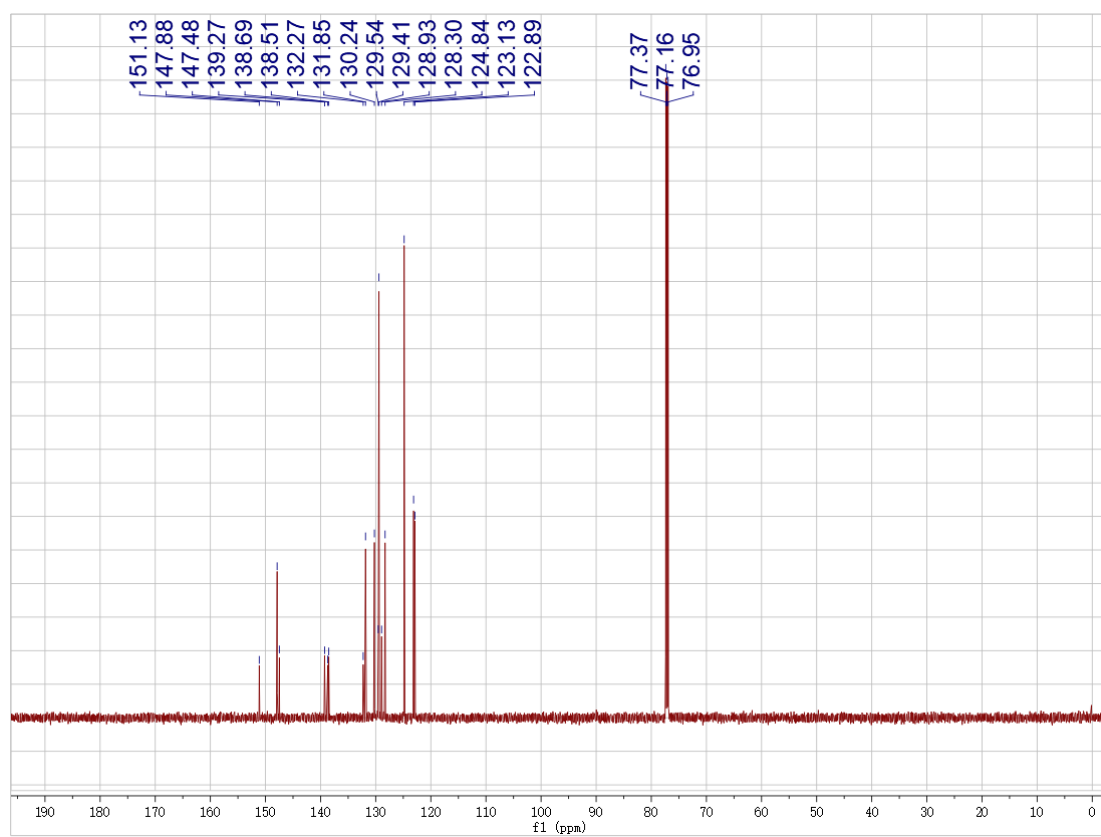


Fig. S4 ^{13}C NMR spectra of TPAQ-Ph in CDCl_3 .

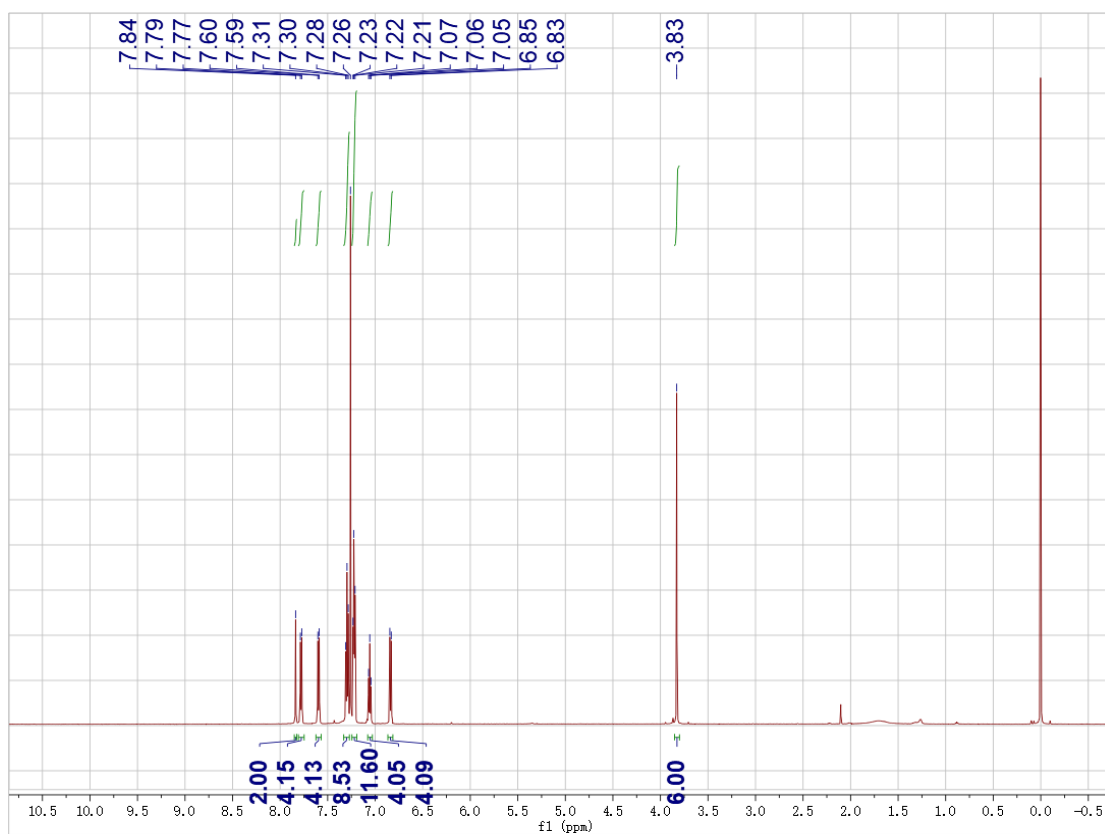


Fig. S5 ^1H NMR spectra of TPAQ-PhOMe in CDCl_3 .

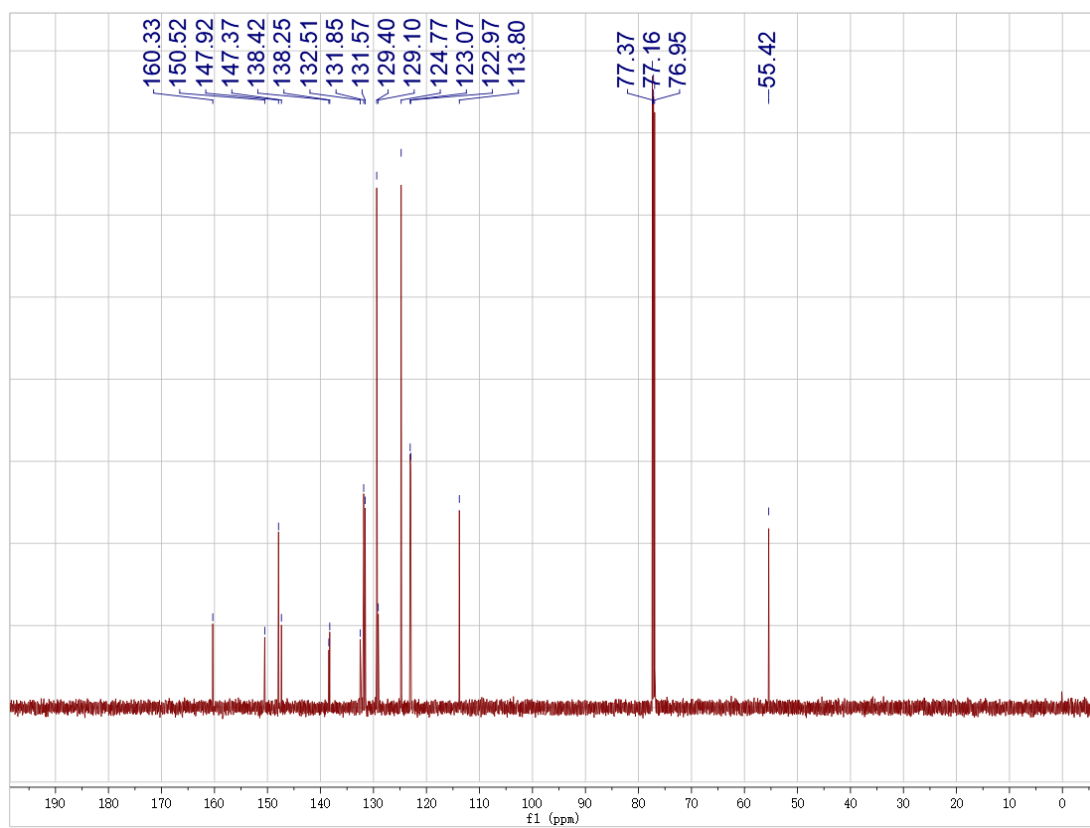


Fig. S6 ^{13}C NMR spectra of TPAQ-PhOMe in CDCl_3 .

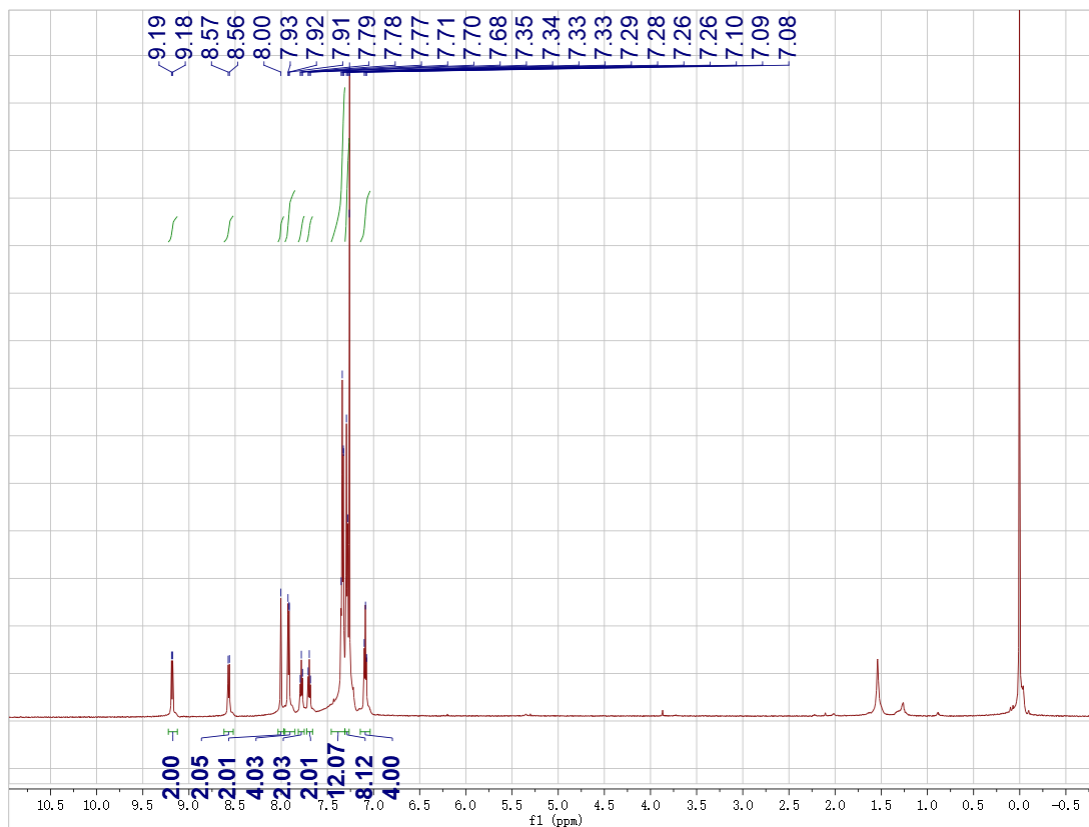


Fig. S7 ^1H NMR spectra of TPAQ-Phen in CDCl_3 .

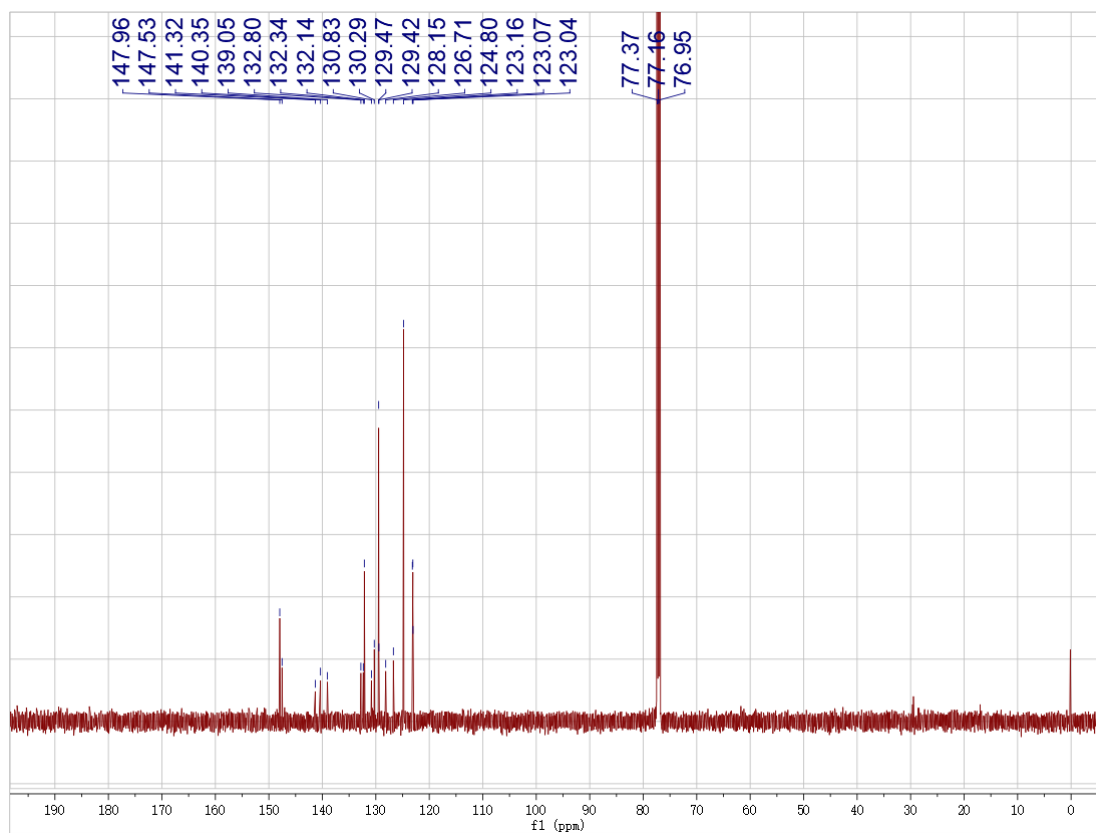


Fig. S8 ^{13}C NMR spectra of TPAQ-Phen in CDCl_3 .

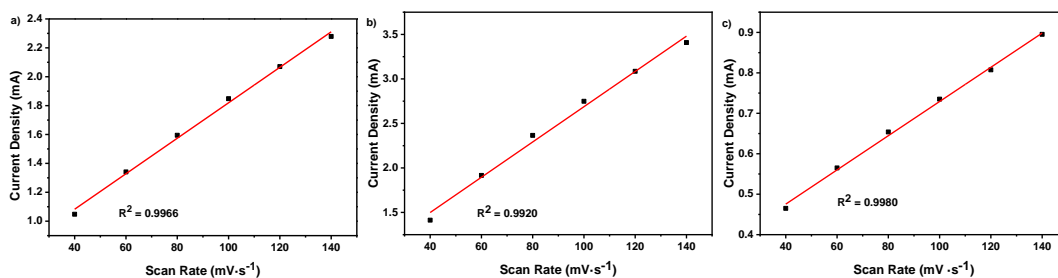


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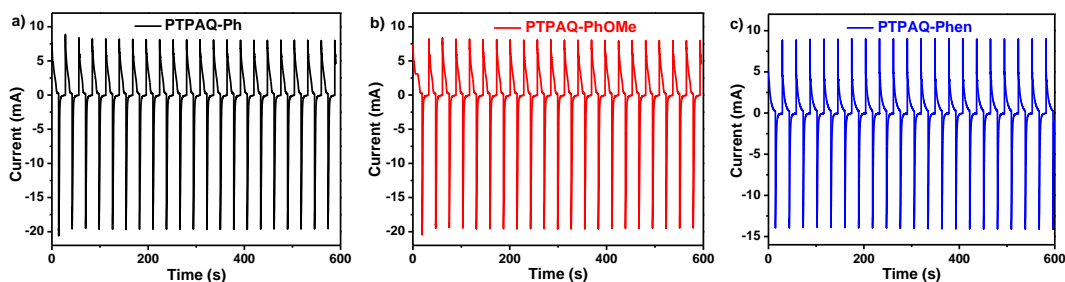


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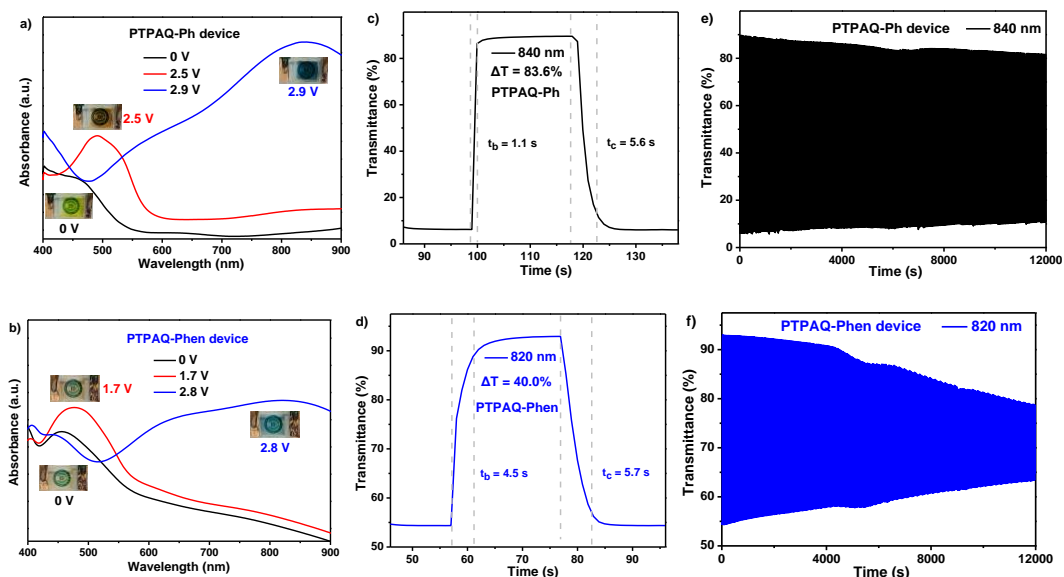


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Reference

1. Frisch, M. J.; Trucks, G. W.; Schlegel, H. B.; Scuseria, G. E.; Robb, M. A.; Cheeseman, J. R.; Scalmani, G.; Barone, V.; Mennucci, B.; Petersson, G. A.; Nakatsuji, H.; Caricato, M.; Li, X.; Hratchian, H. P.; Izmaylov, A. F.; Bloino, J.; Zheng, G.; Sonnenberg, J. L.; Hada, M.; Ehara, M.; Toyota, K.; Fukuda, R.; Hasegawa, J.; Ishida, M.; Nakajima, T.; Honda, Y.; Kitao, O.; Nakai, H.; Vreven, T.; Jr. Montgomery, J. A.; Peralta, J. E.; Ogliaro, F.; Bearpark, M.; Heyd, J. J.; Brothers, E.; Kudin, K. N.; Staroverov, V. N.; Kobayashi, R.; Normand, J.; Raghavachari, K.; Rendell, A.; Burant, J. C.; Iyengar, S. S.; Tomasi, J.; Cossi, M.; Rega, N.; Millam, J. M.; Klene, M.; Knox, J. E.; Cross, J. B.; Bakken, V.; Adamo, C.; Jaramillo, J.; Gomperts, R.; Stratmann, R. E.; Yazyev, O.; Austin, A. J.; Cammi, R.; Pomelli, C.; Ochterski, J. W.; Martin, R. L.; Morokuma, K.; Farkas, O.; Foresman, J. B.; Fox, D. J. *Gaussian 16, Rev. A.03*; Gaussian, Inc.: Wallingford, CT, **2016**.