Supporting Information

Paper-based bipolar electrode-electrochemiluminescence switch for label-free and sensitive genetic detection of pathogenic bacteria

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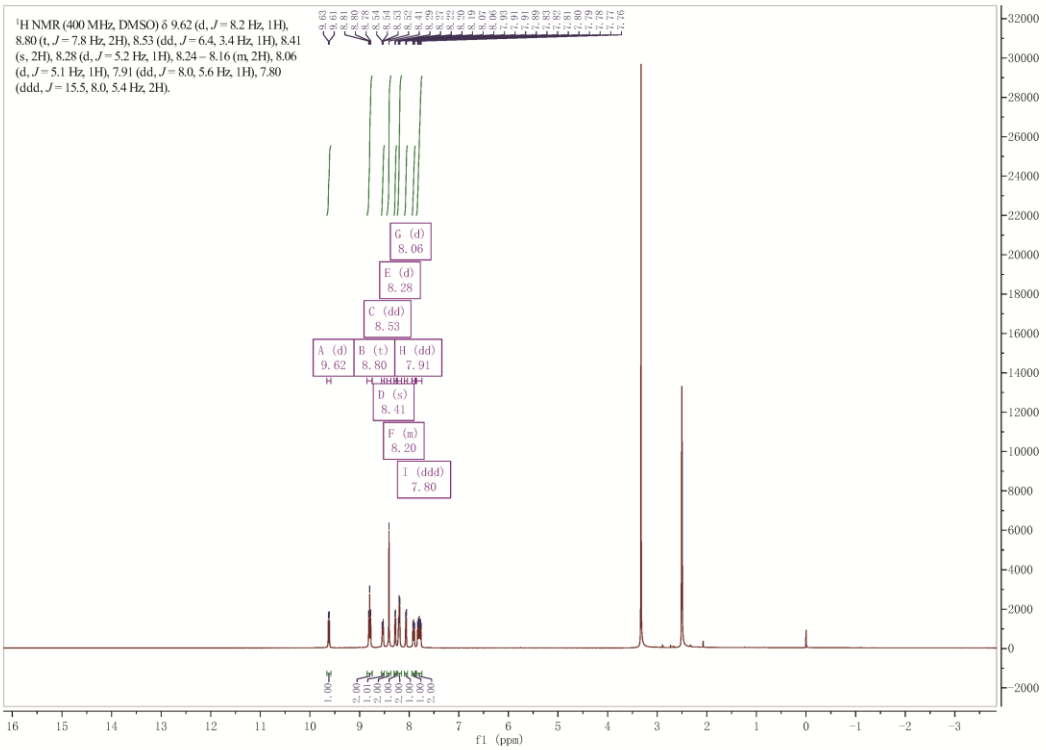
1. Systhesis and characterization of $[Ru(phen)_2dppz](PF_6)_2$

$[Ru(phen)_2dppz](PF_6)_2$ was synthesized according to previously reported methods.[1-3] Briefly, $[Ru(phen)_2dppz](PF_6)_2$ was obtained by putting dppz (0.100 g, 0.355mmol) and *cis*-$Ru(phen)_2Cl_2$ (0.188 g, 0.355mmol) into a component solvent of ethyl alcohol and water (3:1). The mixture was heated to reflux under a nitrogen atmosphere for 8h to give the product as anorange solid. The Cl^- was then exchanged by $PF6^-$ and the raw product was purified with silica gel column (CH_3CN: toluene = 1:1). The volatiles were removed under reduced pressure and the remaining solid was recrystallized with CH_3CN and diethyl ether to give red crystals(0.224g, 0.216mmol; Yield: 59.9%).^{1}H NMR (400 MHz, $[D_6]$DMSO): δ 9.62 (d, J = 8.2 Hz, 2H; phen-H), 8.80 (t, J = 7.8 Hz, 4H; phen-H), 8.53 (dd, J = 6.4, 3.4 Hz, 2H; dppz-H), 8.41 (s, 4H; phen-H), 8.28 (d, J = 5.2 Hz, 2H; dppz-H), 8.24 – 8.16 (m, 4H; phen-H), 8.06 (d, J = 5.1 Hz, 2H; dppz-H), 7.91 (dd, J = 8.0, 5.6 Hz, 2H; dppz-H), 7.80 (ddd, J = 15.5, 8.0, 5.4 Hz, 4H; phen-H).; MS (ESI): m/z: 889.10. $[M-PF_6]^+$, 372.07 $[M-2PF_6]^{2+}$.The ^{1}H NMR spectra of the compound are given in **Fig. S1**.

A:



B:

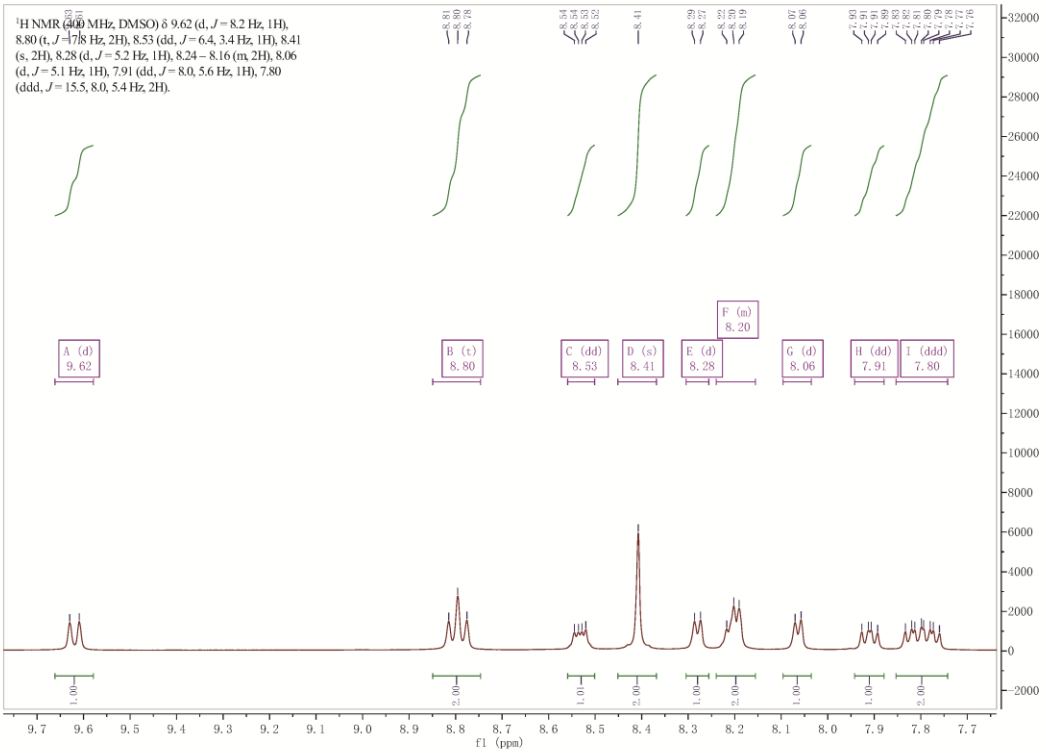


Fig. S1. The ^{1}H NMR spectra of the synthesized $[Ru(phen)_2dppz]^{2+}$

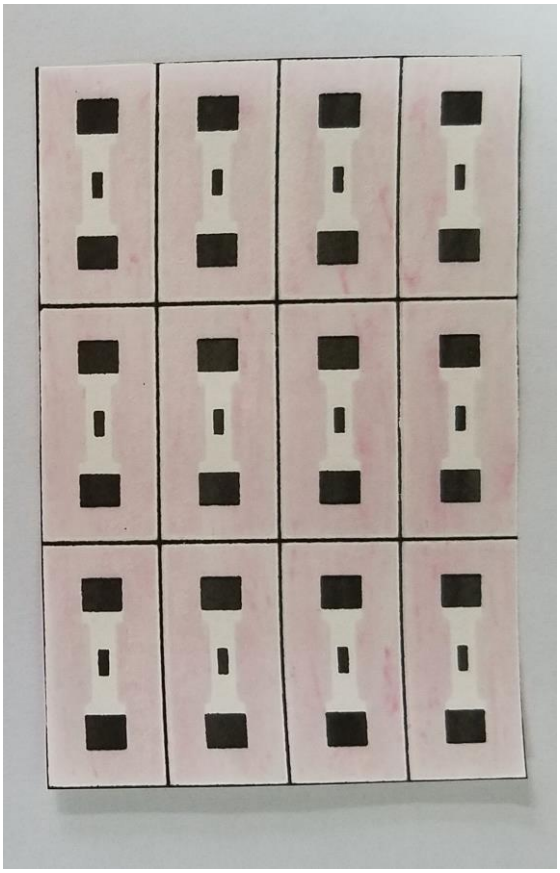


Fig. S2. A small batch of the pBPE fabricated by wax-screen printing and screen printing.

Reference:

(1) Hartshorn, R. M.; Barton, J. K. *J. Am. Chem. Soc.* **1992**, *114*, 5919-5925.

(2) Ye, R.-R.; Ke, Z.-F.; Tan, C.-P.; He, L.; Ji, L.-N.; Mao, Z.-W. *Chem. – Eur. J.* **2013**, *19*, 10160-10169.

(3) Liu, J.; Zheng, W.; Shi, S.; Tan, C.; Chen, J.; Zheng, K.; Ji, L. *J. Inorg. Biochem.* **2008**, *102*, 193-202.