Supporting Information for

Dual-potential electrochemiluminescence film constructed from single AIE luminogens for sensitive detection of malachite green

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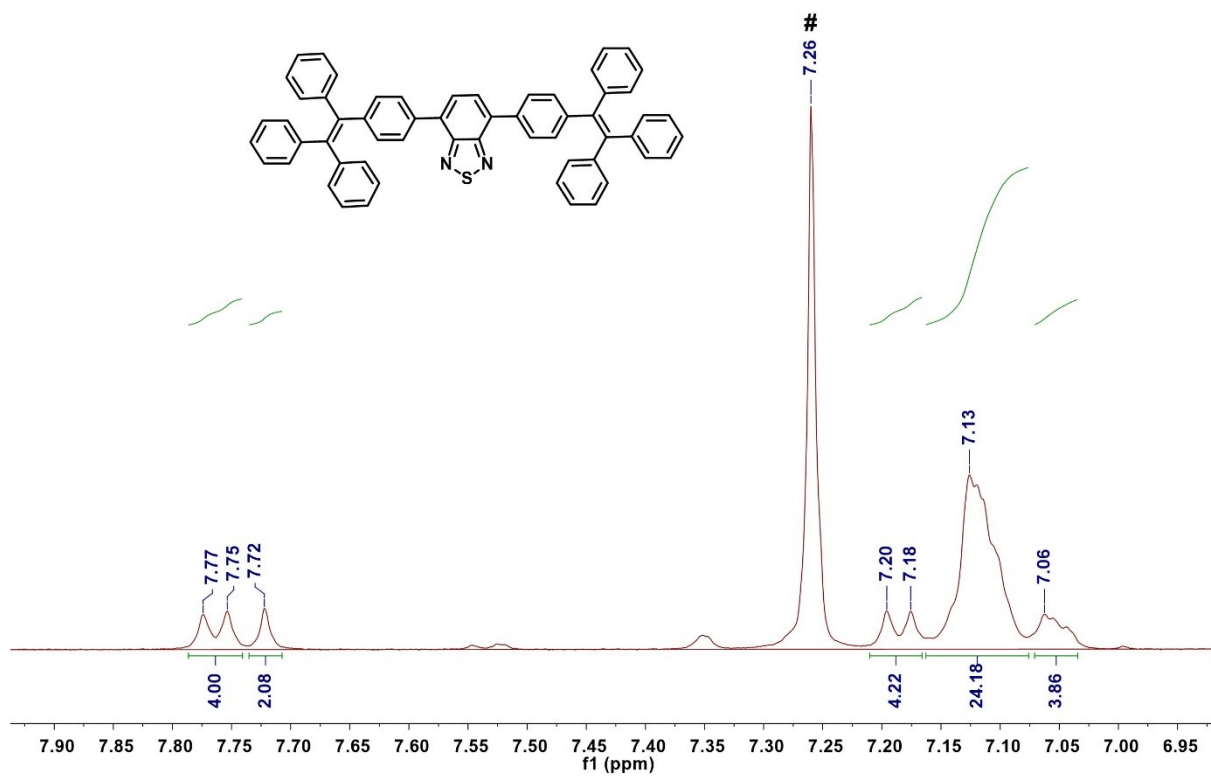
1. Supplementary Table and Figures

Fig. S1 ^{1}H NMR spectrum of **BTPEBT** in CDCl$_3$ (# CDCl$_3$).

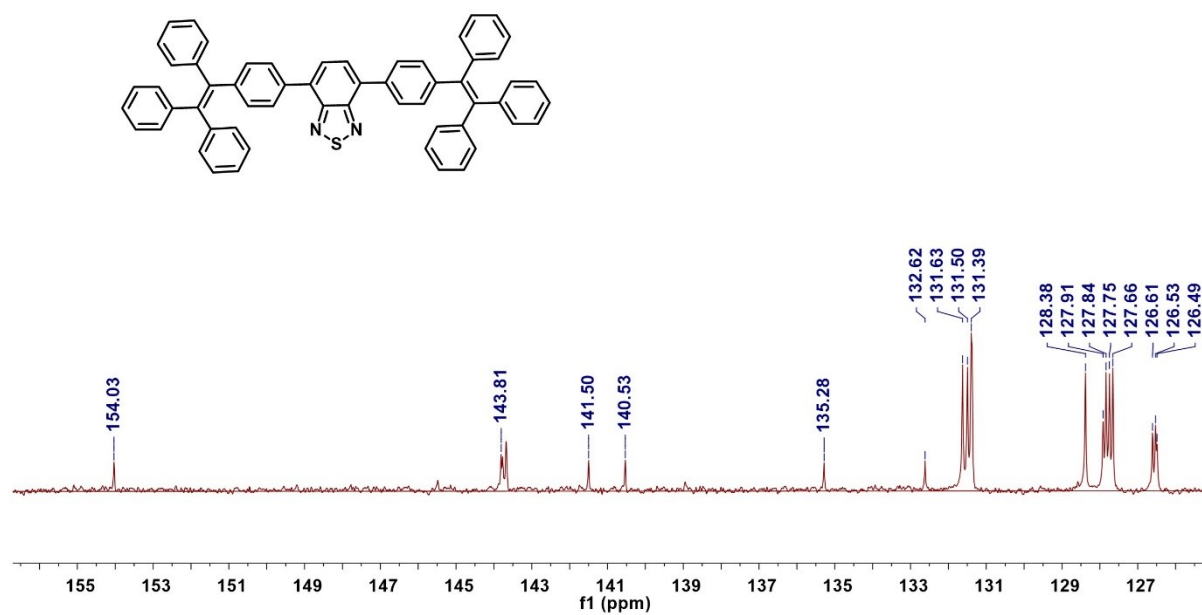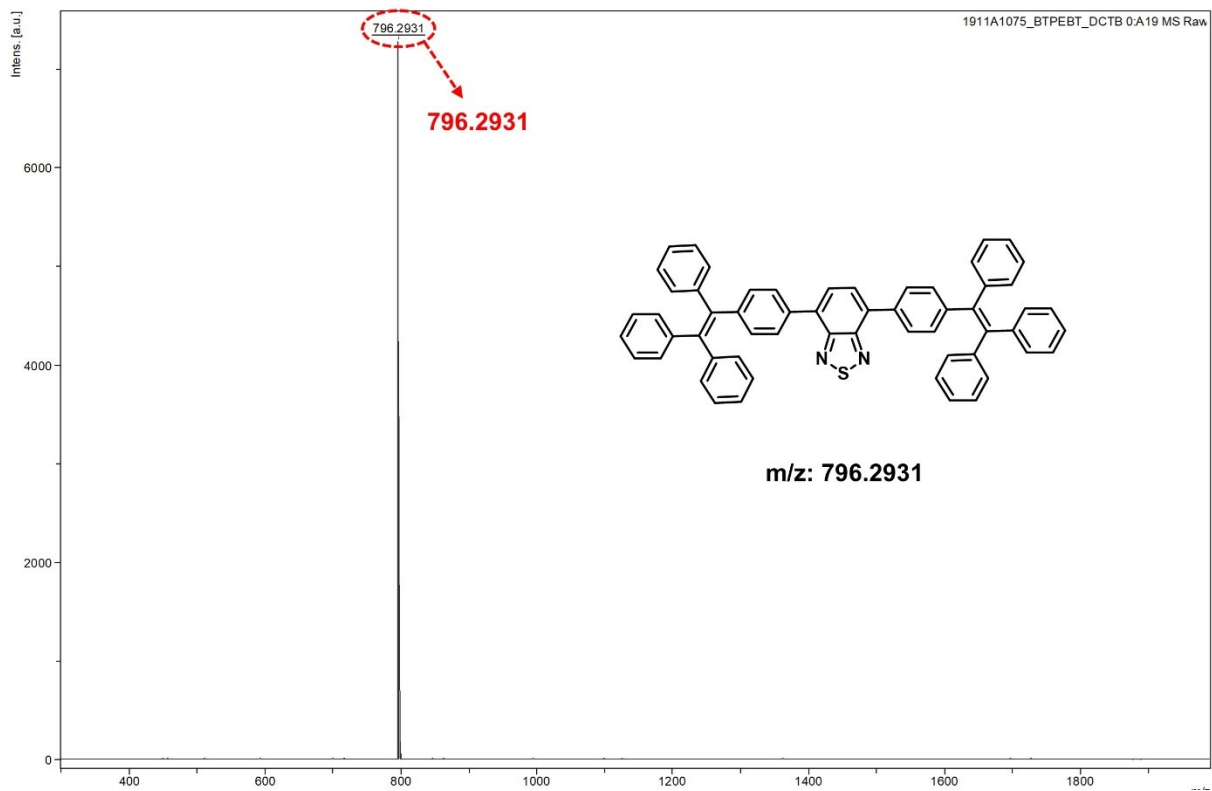**Fig. S2** ^{13}C NMR spectrum of **BTPEBT** in CDCl$_3$.

Fig. S3 HRMS spectrum of **BTPEBT**.

Table S1. The absorption and emission wavelength of **BTPEBT** in different solvents.

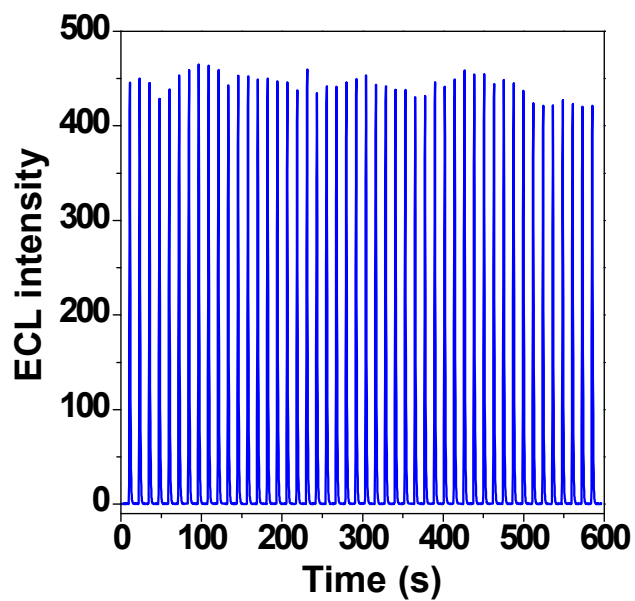| Compound	λ_{ab} [nm]						λ_{PL} [nm]					
	CH	Tol	DO	THF	DCM	DMF	CH	Tol	DO	THF	DCM	DMF
BTPEBT	418	418	418	418	419	420	513	527	533	541	556	572

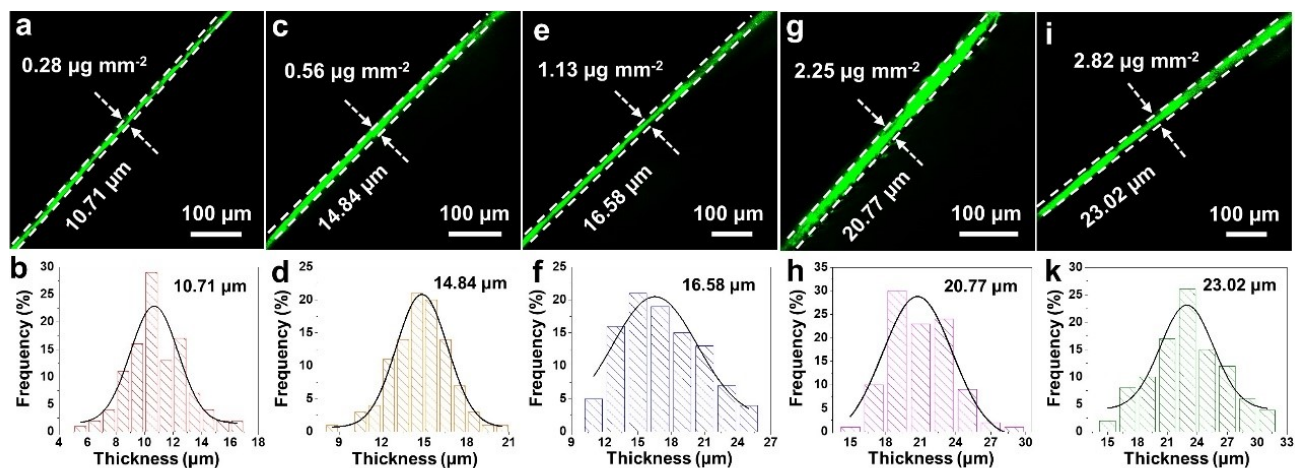

Fig. S4 ECL light transients of **BTPEBT** in DCM solution.

Fig. S5 Fluorescence microscopy images and thickness distribution of **BTPEBT** films on GCE at various loadings of (a) and (b) 0.28 µg mm⁻², (c) and (d) 0.56 µg mm⁻², (e) and (f) 1.13 µg mm⁻², (g) and (h) 2.25 µg mm⁻², and (i) and (k) 2.82 µg mm⁻².
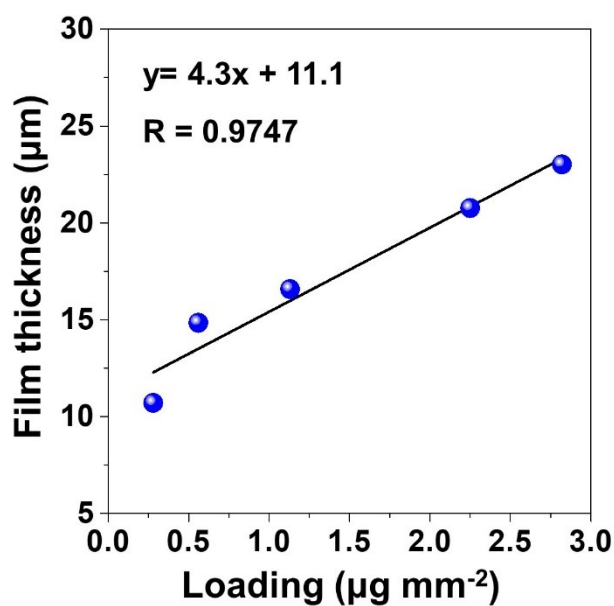

Fig. S6 Plots of thickness of **BTPEBT** film on GCE versus various luminogen loadings.
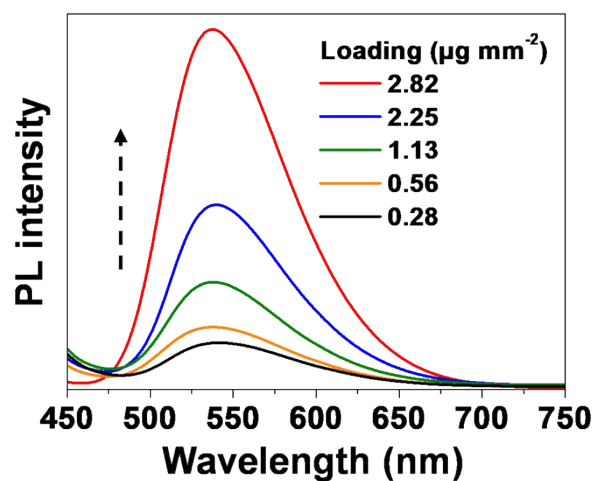
Fig. S7 PL spectra of **BTPEBT** films at various loadings. $\lambda_{ex} = 400$ nm.

Table S2. Fluorescence quantum yield (Φ_F) of solid-state **BTPEBT** films and powder.

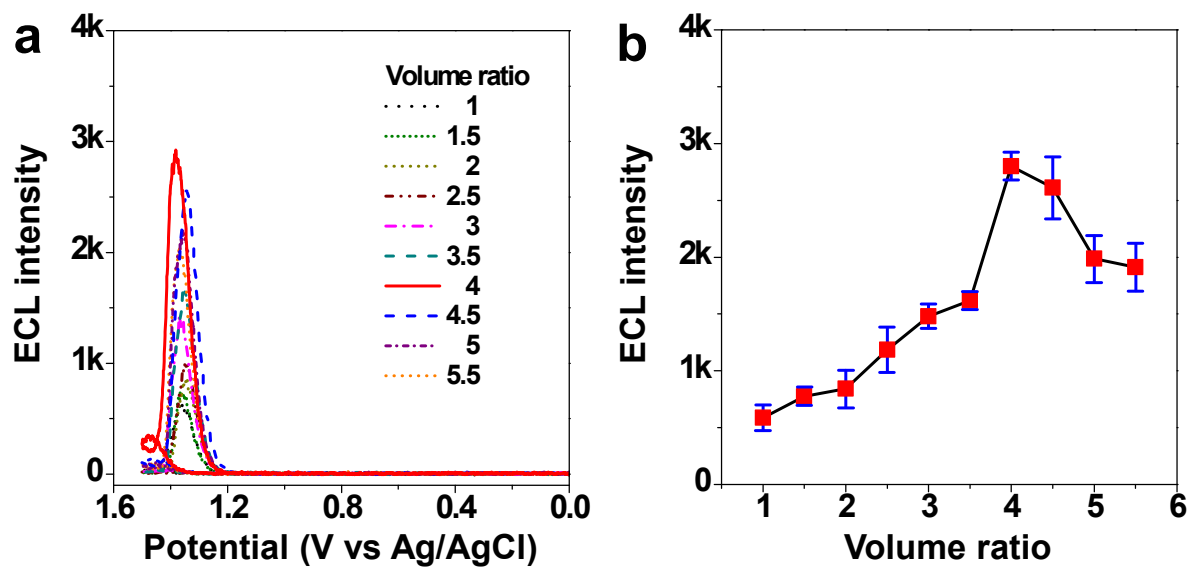| **BTPEBT**	Film					Powder
Loading ($\mu g\ mm^{-2}$)	0.28	0.56	1.13	2.25	2.82	
Φ_F (%)	46.44	50.18	58.62	58.94	60.71	69.8

Fig. S8 Optimized ECL intensity of **BTPEBT** films in MeCN/H$_2$O mixtures containing 20 mM TPrA.

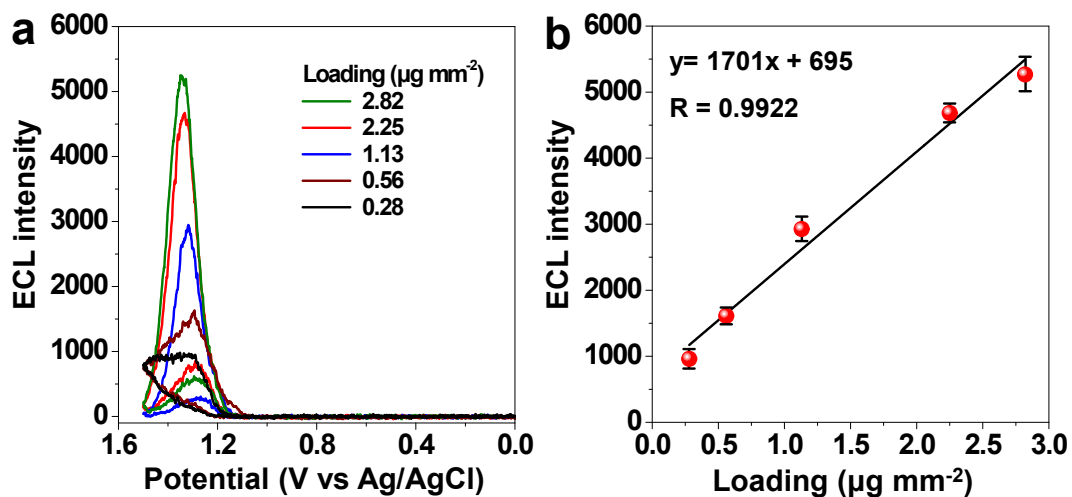(a) ECL profiles and (b) plots of ECL emission maximum with varied volume ratios of mixtures.

Fig. S9 (a) ECL intensity of the **BTPEBT** film with different luminogen loadings. (b) Plots of ECL intensity versus different luminogen loadings.
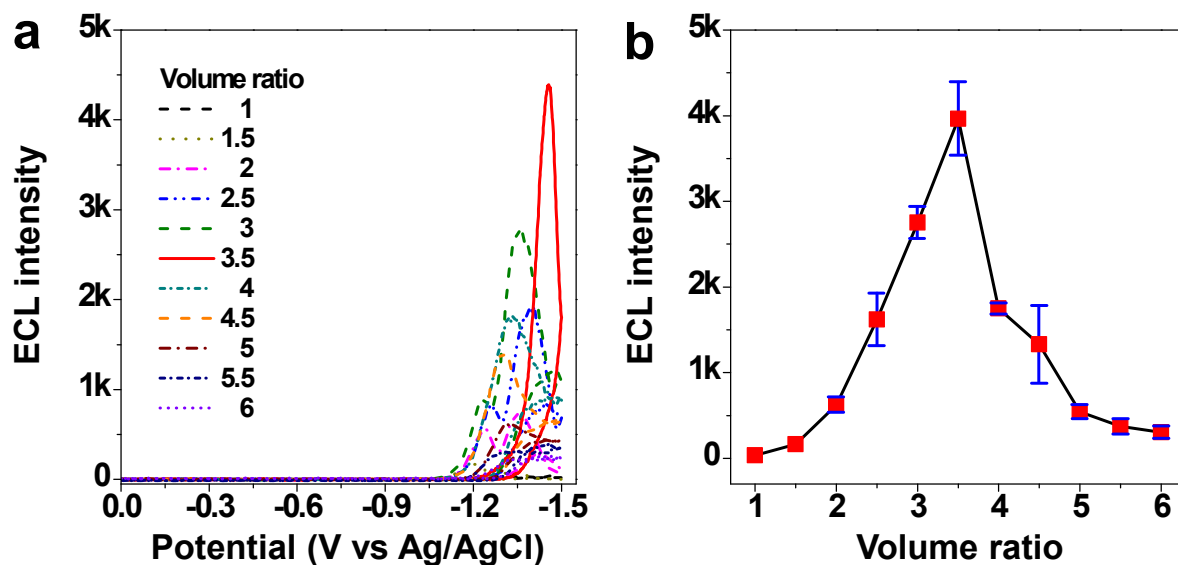

Fig. S10 Optimized ECL intensity of **BTPEBT** films in MeCN/H_2O mixtures containing 30 mM $K_2S_2O_8$. (a) ECL profiles and (b) plots of ECL emission maximum with varied volume ratios of mixtures.
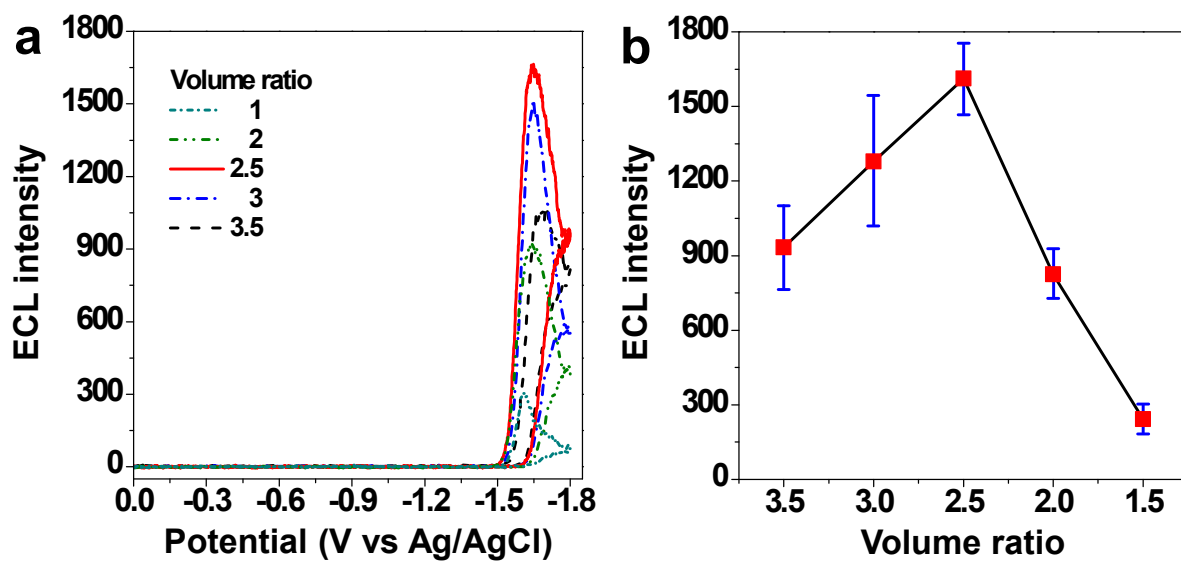
Fig. S11 Optimized ECL intensity of **BTPEBT** films in MeCN/H_2O mixtures containing 32 mM BPO.

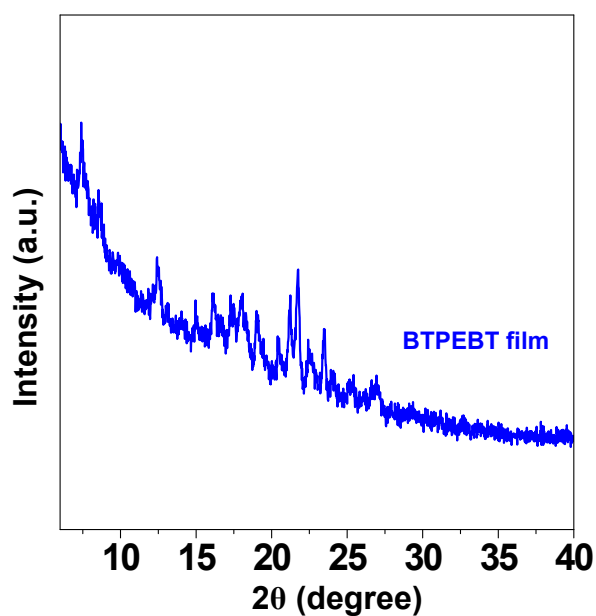(a) ECL profiles and (b) plots of ECL emission maximum with varied volume ratios of mixtures.

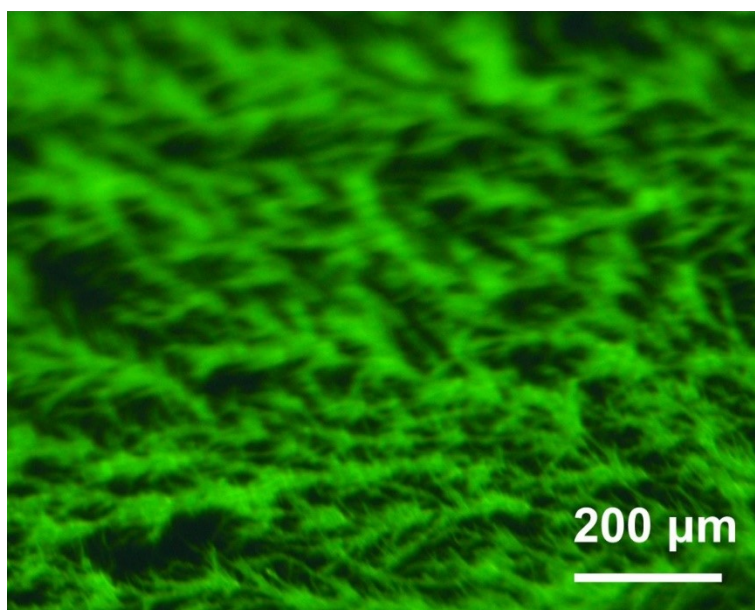**Fig. S12** XRD pattern of the **BTPEBT** film.

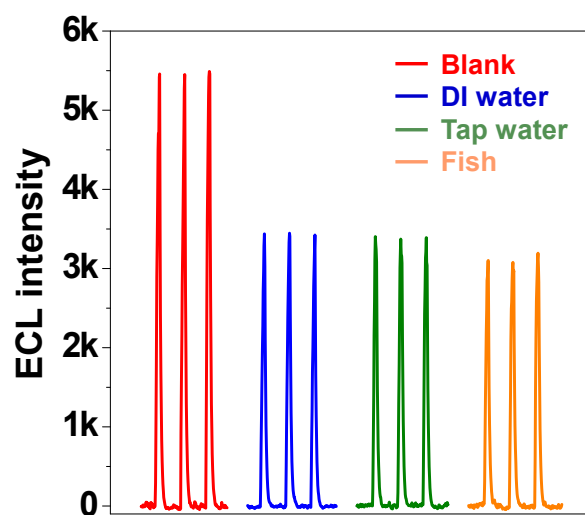**Fig. S13** Fluorescence microscopy image of **BTPEBT** crystals.

Fig. S14 ECL intensity of the **BTPEBT** film in different MG-spiked samples.
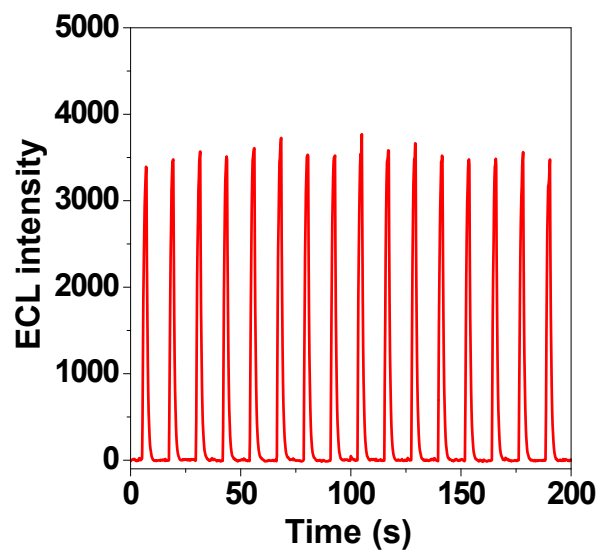
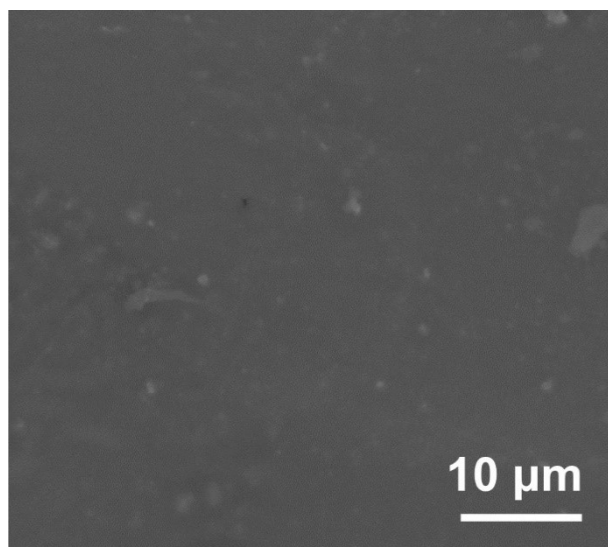**Fig. S15** ECL stability of the recycled **BTPEBT** film with 20 mM TPrA as coreactants.

Fig. S16 SEM image of the **BTPEBT** film on GCE after ECL detection.

2. Determination of ECL efficiency

The ECL efficiencies were calculated using the $Ru(bpy)_3^{2+}/TprA$ system as reference ($\Phi_{ECL} = 5.0\%$) by integration of both ECL intensity and current value versus time for each compound, as described in Equation (S1)

$$\Phi_x = 100\% \times \left[\frac{\int_a^b ECLdt}{\int_a^b Currentdt}\right]_x / \left[\frac{\int_a^b ECLdt}{\int_a^b Currentdt}\right]_{st} \qquad (S1)$$

where x stands for **BTPEBT**, and st represents $Ru(bpy)_3^{2+}$.