Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting information

Electrochemical luminescence modulation in a Eu(III) complex-modified TiO_2 electrode

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1. SEM-EDS analysis of $Eu(tta)_3dcbpy$-modified electrode

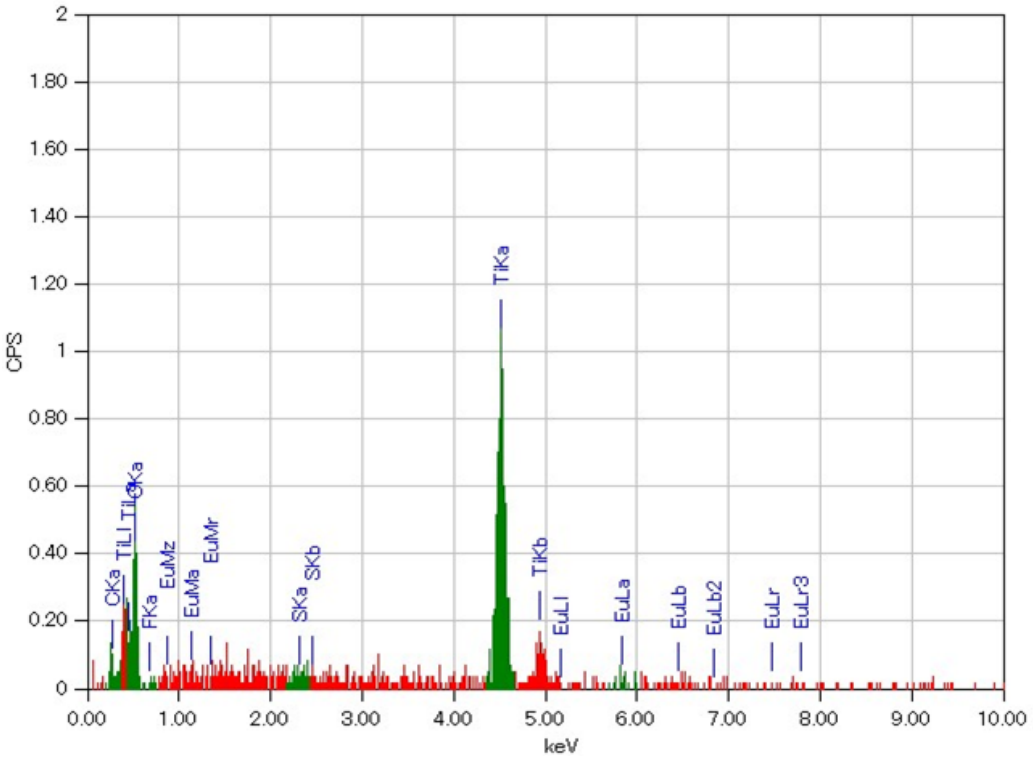

Fig. S1 EDS spectrum of the $Eu(tta)_3dcbpy$-modified electrode.

Table. S1 Elemental ratio of the $Eu(tta)_3dcbpy$-modified electrode.

Element	Atomic [%]
C	13.85
O	61.30
F	–
S	0.14
Ti	23.97
Eu	0.73

2. *Measurement configuration of* the fluorescence spectroelectrochemical cell

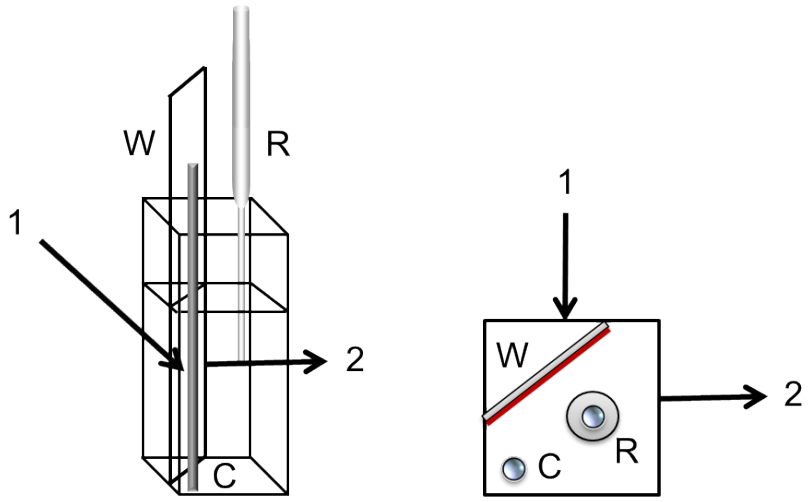

Fig. S2 Schematic representation of measurement configuration of the fluorescence spectroelectrochemical cell: connection for (W) working, (R) reference, and (C) counter electrode: Eu(tta)$_3$dcbpy-modified electrode, Ag/AgCl, and Pt wire. (1) Excitation source. (2) Emission detector.

3. Emission decay profiles of $Eu(tta)_3(H_2O)_2$ and $Eu(tta)_3$dcbpy-modified TiO_2 electrode

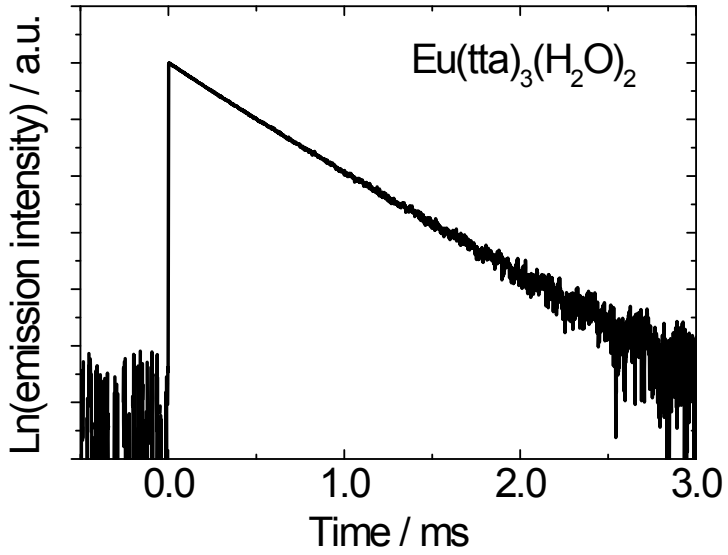

Fig. S3 Emission decay profile of the PC solution containing 50 μM $Eu(tta)_3(H_2O)_2$ by using the quartz cell whose path length is 1 mm. Excitation wavelength is 337 nm.

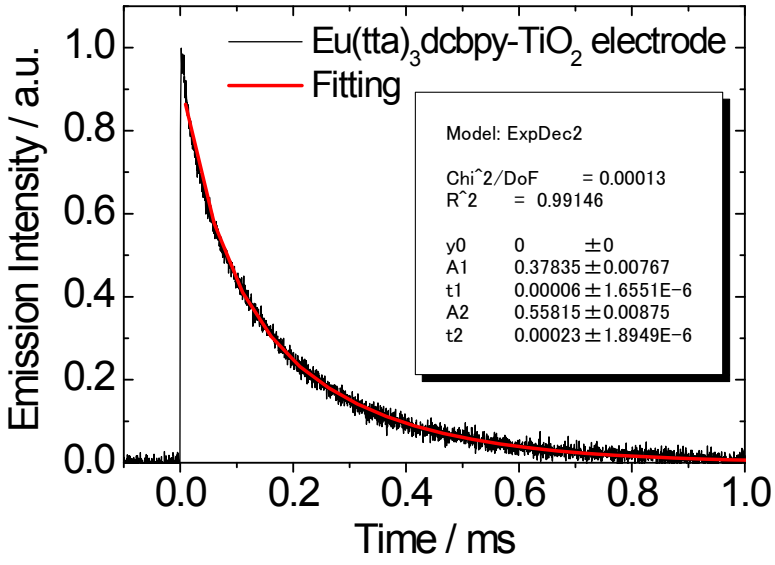

Fig. S4 Emission decay curves of $Eu(tta)_3$dcbpy-modified TiO_2 electrode without solution. Excitation wavelength is 337 nm. Fitting function was employed biexponential decay.

4. Measurement configuration of the fluorescence spectroelectrochemical cell

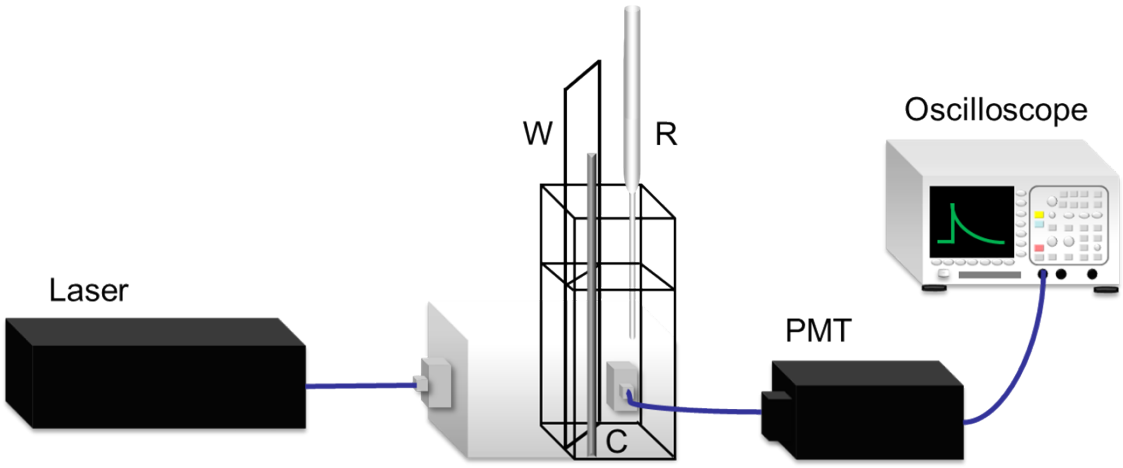

Fig. S5 Schematic representation of emission lifetime measurement system: connection for (W) working, (R) reference, and (C) counter electrode: $Eu(tta)_3$dcbpy complex-modified electrode, Ag/AgCl, and Pt wire. Wavelength of the laser is 337 nm.

5. Emission decay profiles of Eu(tta)$_3$dcbpy modified TiO$_2$ electrode under open circuit and application potential

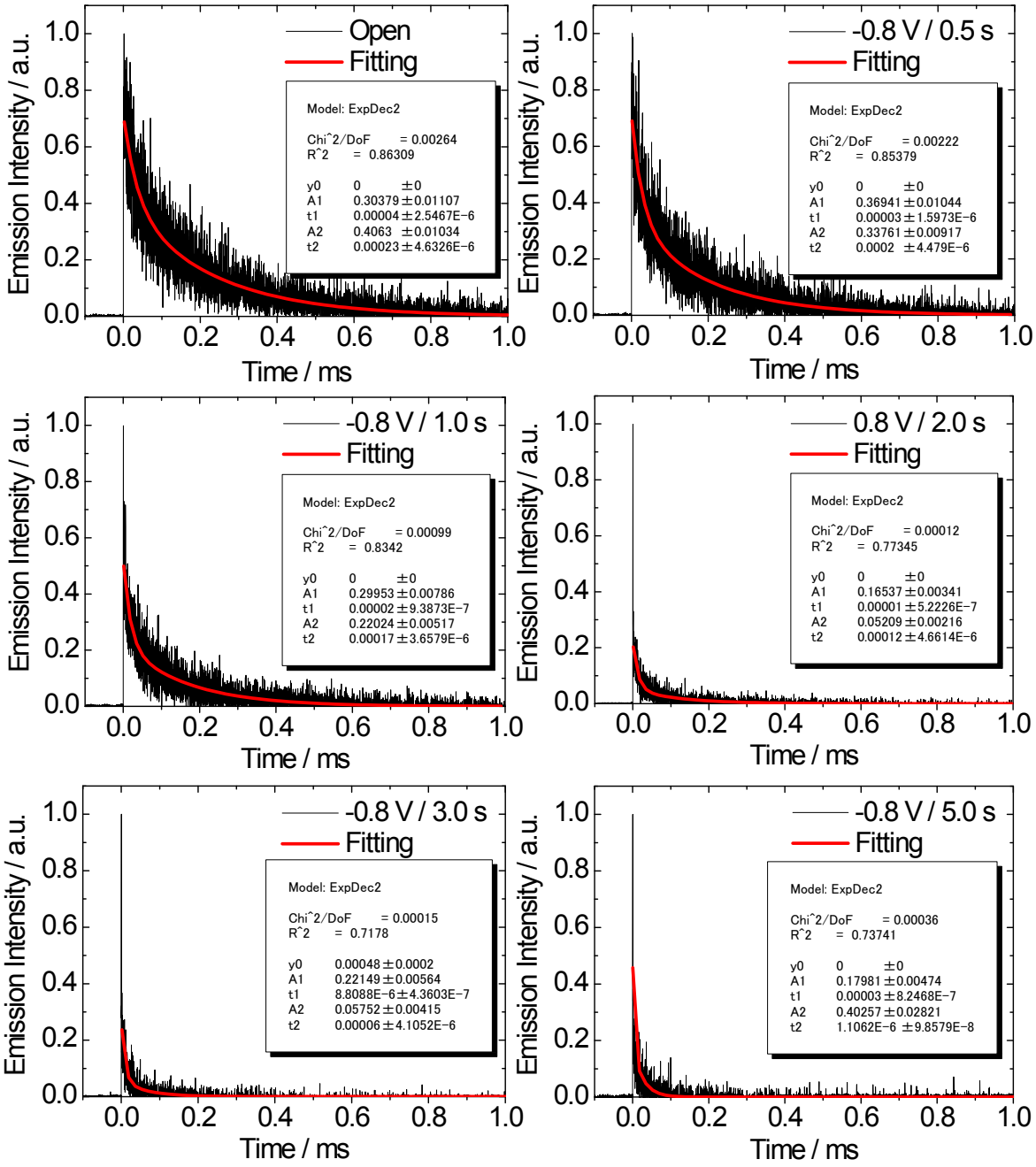

Fig. S6 Emission decay curves of Eu(tta)$_3$dcbpy modified on TiO$_2$ electrode by irradiated at 337 nm when the potential at -0.8 V (vs. Ag/AgCl) was applied to the cell for 0, 0.5, 1, 2, 3, and 5 s.

6. Absorption spectra of tta and $Eu(tta)_3(H_2O)_2$

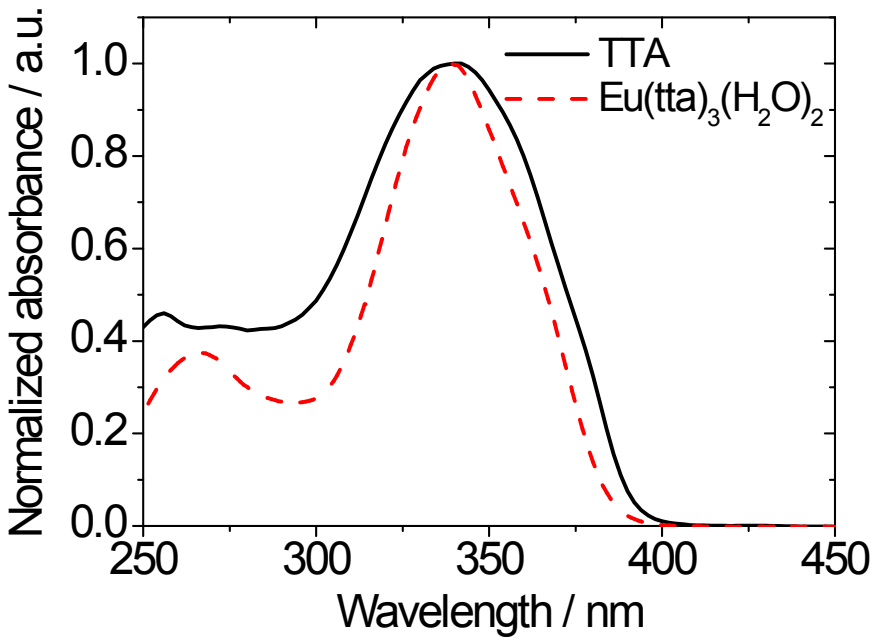

Fig. S7 Normalized absorption spectra of TTA (10 μM, black line) and $Eu(tta)_3(H_2O)_2$ (10 μM, red dashed line) in PC solution.

7. Cyclic voltammograms of TTA and $Eu(tta)_3(H_2O)_2$

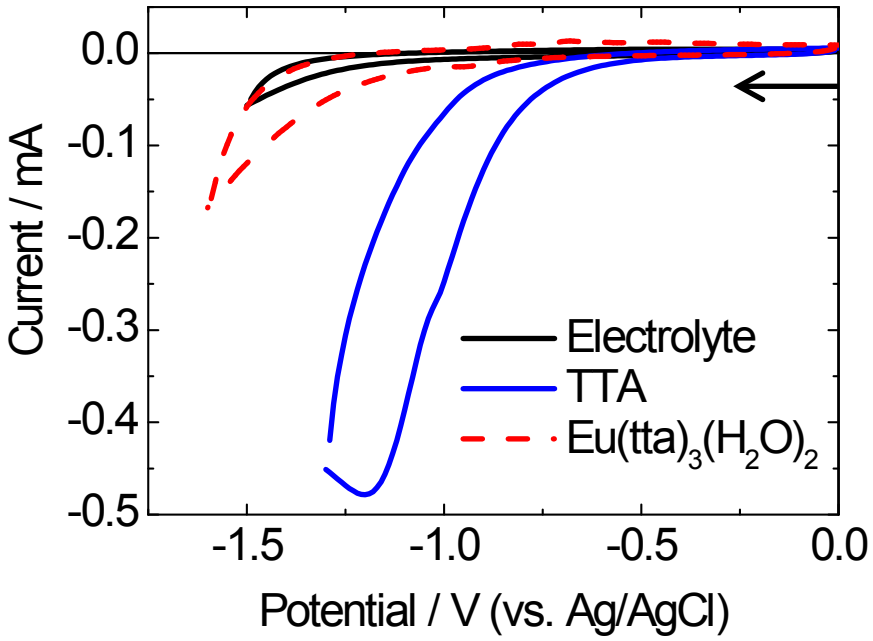

Fig. S8 CVs of PC solution containing in tta (10 mM, blue line) or $Eu(tta)_3(H_2O)_2$ (10 mM, red dashed line) and $LiClO_4$ (200 mM, black line). Scan rate was 50 mV/s.