New platinum and ruthenium Schiff base complexes for water splitting reactions

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**Figure S1.** UV-vis absorption spectra of complexes 1 and 2 in degassed DMF (1.0 × 10⁻⁵ M) solution at room temperature.

**Figure S2.** UV-vis absorption spectra of complexes 1 and 2 in degassed DMF/H₂O (9:1) mixed solvents (1.0 v×v10⁻⁵ M).
**Figure S3.** UV-vis absorption spectra of complex 1 in DMF and DMF/H₂O (9:1) mixed solvents (1.0 × 10⁻⁵ M).

**Figure S4.** UV-vis absorption spectra differences of complex 2 in DMF and DMF/H₂O (9:1) mixed solvents (1.0 × 10⁻⁵ M).
**Figure S5.** Emission spectra of complexes 1 and 2 in air-saturated DMF and DMF/H₂O (9:1) mixed solution (1.0×10⁻⁵ M) at room temperature, excitation upon 480 nm.

![Emission spectra of complexes 1 and 2 in air-saturated DMF and DMF/H₂O (9:1) mixed solution (1.0×10⁻⁵ M) at room temperature, excitation upon 480 nm.](image1)

**Figure S6.** Emission spectra of complexes 1 and 2 in degassed DMF and DMF/H₂O (9:1) mixed solution (1.0 × 10⁻⁵ M) at room temperature, excitation upon 480 nm.

![Emission spectra of complexes 1 and 2 in degassed DMF and DMF/H₂O (9:1) mixed solution (1.0 × 10⁻⁵ M) at room temperature, excitation upon 480 nm.](image2)
**Figure S7.** Emission spectrum of complex 1 in solid state at room temperature, excitation upon 480 nm.

**Figure S8.** Emission spectrum of complex 2 in solid state at room temperature, excitation upon 480 nm.
Figure S9. Cyclic voltammetric curves of complexes 1 (up) and 2 (down). Sample concentration is $1.0 \times 10^{-4}$ M in 0.1M n-Bu$_4$NPF$_6$/DMF, scan rate 100 mV s$^{-1}$ at room temperature, working electrode: glassy carbon, counter electrode: Pt foil; reference electrode: saturated calomel electrode (SCE). Potential in V vs. SCE.
Figure S10. Optical absorption spectral changes of complex 1 (1.0 × 10\(^{-5}\) M) containing K\(_2\)PtCl\(_4\) aqueous solution (3.0 × 10\(^{-5}\) M), TEA (0.86 M) before irradiation and after 10 h of irradiation.

Figure S11. Images of the 12 h reaction solutions of complex 2 in the absence (left) and presence (right) of TiO\(_2\) used for absorbance and fluorescence tests.
**Figure S12.** UV-vis profiles of complexes 3 and 4 in CH$_3$CN (5.0 × 10$^{-5}$ M).

**Figure S13.** (A) Absorption spectral changes of CAN at 360 nm after mixing complex 3 (0.01 mM) with various concentrations of CAN aqueous solution, no data were collected in the first 12 s due to injecting CAN and shaking cell. (B) Plots of initial rate $k_{\text{obs}}$ calculated by linear fitting the data from 0 to 300 s in the upper portion versus [Ce$^{4+}$]. CAN loss is first order in ACN with a first-order rate constant of 1.0 × 10$^{-3}$ s$^{-1}$. (C) Monitoring CAN decay at 360 nm after the addition of complex 3 (0.5, 1.0, 1.5, 2.0 μM). (D) Plots of $k_{\text{obs}}$ versus [3], the initial rates $k_{\text{obs}}$ were calculated by linear fitting the data from 0 to 60 s, CAN loss is first order in 3 with a first-order rate constant of 0.87 s$^{-1}$. 
Figure S14. Preparation procedures of complex 1 and complex 2.

Figure S15. MALDI-TOF mass spectrum of complex 1 (up, 610.2 [M + H]+; 632.2 [M + Na]+) and complex 2 (down, 654.2 [M + H]+; 676.2 [M + Na]+).
Figure S16. Preparation procedure of complexes 3 and 4.

Figure S17. MALDY-TOF of complexes 3 (up) and 4 (down).
Figure S18. $^1$H NMR spectra of complexes 3 in CDCl$_3$ (up) and 4 in d$_6$-DMSO (down).
Figure S19. HRMS spectra of complexes 3 (up) and 4 (down) in CH$_3$CN and H$_2$O.